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ASTOUNDING STORIES

JUNE 20¢

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NRA CODE

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by
HARRY BATES

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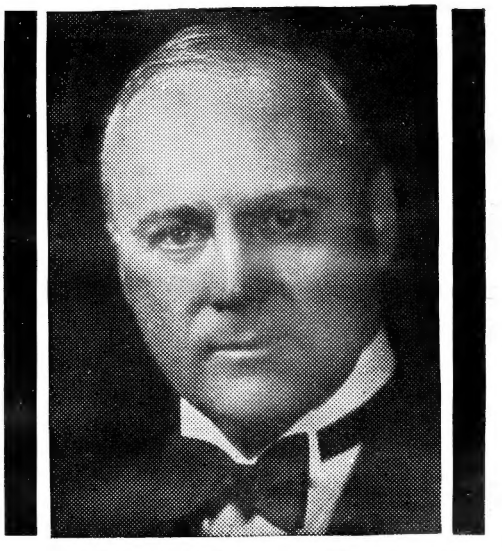

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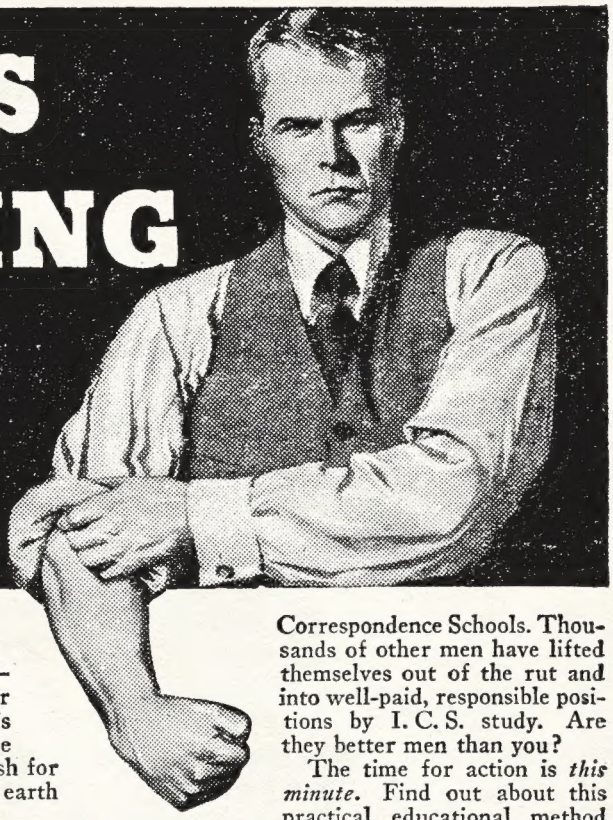

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ASTOUNDING STORIES

JUNE
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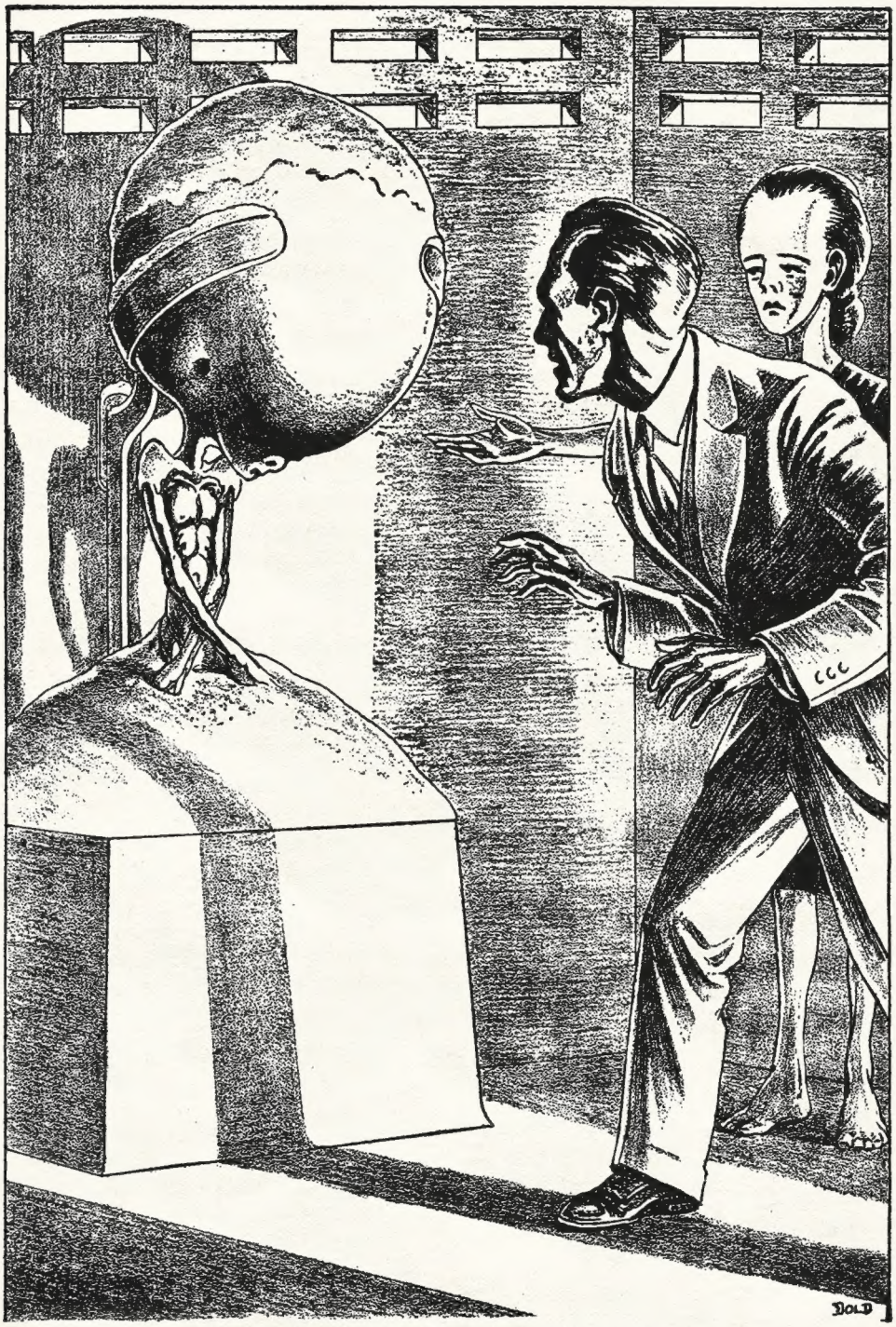


"Why should he move?" she asked.
That stopped me for a little.

Alas, All Thinking!

A new theory of the end of the world in which we contact a human baroque!

by HARRY BATES

STRICTLY CONFIDENTIAL. (This is dynamite! Be careful who sees it!)

From: Charles Wayland.

To: Harold C. Pendleton, Chairman of the Human Salvage Section of the National Lunacy Commission.

Subject: Report on the conversations and actions of Harlan T. Frick on the night of June 7, 1963.

Method: I used the silent pocket dictograph you gave me; and my report is a literal transcription of the record obtained, with only such additions of my own as are needed to make it fully intelligible.

Special Notes: (a) The report, backed by the dictograph record, may be considered as one third of the proof that your "amateur neurosis detective" Wayland is not himself a subject for psychopathic observation, since this fantastic report can be corroborated in all its details by Miles Matson, who was with us that night, and would be, I think, by Frick himself.

(b) Pending any action by you, I have cautioned both Matson and Frick to maintain absolute silence with regard to the conversation and events covered. They may be trusted to comply.

(c) So that you may follow the report more intelligently, I feel that it is necessary to say here, in advance, that Frick will be proved to be wholly sane, but that never again may his tremendous talents be utilized for the advancement of science. As his friend, I have to recommend that you give up all hope of salvaging him, and leave him to go his prodigal, pleasure-seeking way alone. You might think of him as a great scientist who has died. He is reasonable, but human, and I see his waste of his life as humanly reasonable. You will see, too.

Report: The amazing events of the evening started in a manner commonplace enough at the Lotus Gardens, where I had made a dinner engagement with Frick and our old mutual friend, Miles Matson, chemist and recent author of an amusing mathematical theory of inverse variables as applied to feminine curves, which Frick had expressed a desire to hear. I should have preferred to observe Frick alone, but was not sure that alone I would be able to hold the interest of his restless, vigorous mind for a third time within two weeks. Ten minutes of boredom and my psychological observations would come to a sudden end, and you would have to find and impress some one else to do your psychological sleuthing.

I got to our reserved table fifteen minutes early, to get settled, set up the dictograph in my pocket, and review for the last time my plans. I had three valuable leads. I had discovered (see my reports of May 26th and May 30th) peculiar, invariable, marked emotional reactions in him when the words "brains," "human progress," and "love" were mentioned. I was sure that this was symptomatic. And I hoped to get nearer the roots of his altered behavior pattern by the common method of using

a prepared and memorized list of words, remarks, and questions, which I would spring on him from time to time.

I could only trust that Frick was not too familiar with psychoanalysis, and so would not notice what I was doing.

I confess that for a moment while waiting I was swept with the feeling that it was hopeless, but I soon roused from that. One can do no more than try, and I was going to try my hardest. With another I might have been tempted to renege, but never with Frick. For he was my old friend of college days, and so eminently worth saving! He was still so young; had so much to give to mankind!

I guessed once more at the things that might have altered his pattern so. A physicist, perhaps the most brilliant and certainly the most promising in the world, enters his laboratory after his graduation from college and for eleven years hardly so much as sticks his nose outside its door. All the while he sends from it a stream of discoveries, new theories, and integrations of old laws the like of which has never before been equaled; and then this same physicist walks out of his laboratory, locks the door, shuns the place, and for two years devotes himself with casual abandon to such trivialisms of the modern idler as golfing, clothes, travel, fishing, night clubs, and so on. Astounding is a weak word for this spectacle. I could think of nothing that would remotely suit.

MILES MATSON arrived a minute early—which was, for him, a phenomenon, and showed how the anticipation of dining with Frick had affected him. Miles is forty-five, short, solid, bald—but then I needn't describe him.

"He'll come?" were his first words, before seating himself on the other side of the table.

"I think so." I assured him, smiling a little at his apparent anxiety. He looked a little relieved, and fished from the jacket of his dinner clothes that abominable pipe he smokes whenever and wherever he pleases, and be damned to frowning head waiters. He lighted it, took a few quick puffs, then leaned back, smiled, and volunteered frankly:

"Charles, I feel like a little boy about to have dinner with the principal of his school."

I could understand that, for most scientists would feel that way where Frick was concerned. I smiled, too, and chaffed him.

"What—you and that pipe intimidated by a mere playboy?"

"No—by the mystery behind the playboy," was his serious rejoinder. "What's your guess at the solution? Quick, before he comes." he asked earnestly.

I shrugged my shoulders. Miles, of course, was not in my confidence.

"Could it be a woman?" he went on. "I haven't heard of any one woman. A disappointment in his work? Some spoiled-child reaction? Is he crazy? What's made the change?"

If I only knew!

"Frick, further than any man alive, has touched out to the infinite unknowable," he continued almost grumbling; "and I want to know how such a man can trade his tremendous future for a suit of evening clothes!"

"Perhaps he is just relaxing a little," I suggested with a smile.

"Ah, of course—relaxing," he answered sarcastically. "For two years!"

I knew at once Frick had heard what we had been saying, for at that moment I looked up and around just in time to see him, lean and graceful in his dinner clothes, his mouth twisted with amusement, stepping past the head waiter to his place at the table. Miles and I rose; and we must have shown our confusion, for one simply did not mention that topic in Frick's hearing. But he showed no offense—indeed, he seemed in unusually good spirits—for he lightly acknowledged our greeting, waved us

back in our places, and, seating himself, added to our dialogue:

"Yes, for two years. And will for forty-two more!"

This opening of the conversation threw me unexpectedly off stride, but I remembered to switch on the dictograph, and then seized the opportunity to ask what otherwise I would never have dared.

"Why?"

Still he showed no offense, but instead, surprisingly, indulged in a long low chuckle that seemed to swell up as from a spring of inexhaustible deliciousness. He answered cryptically, bubblingly, enjoying our puzzlement with every word.

"Because Humpty Dumpty had a great fall. Because thought is withering, and sensation sweet. Because I've recovered my sense of humor. Because 'why' is a dangerous word, and makes people unhappy. Because I have had a glimpse of the most horrible cerebral future. Yes!" He laughed, paused for a moment, then said in a lower voice with dramatic impressiveness, "Would you believe it? I have terminated the genus Homo Sapiens."

II.

HE WAS not drunk, and, as you will see, not crazy—though I would not have bet any money on it just then. His mood was only one of extraordinary good humor. Vastly amused at our reaction to his wild words, he allowed himself to shock us, and did it again and again. I might say here that it is my opinion that all the revelations of the night were, in the main, the result of Frick's sudden notion to shock us, and that no credit whatever is due me and my intended plan of psychological attack.

Miles' face showed blank dismay. Frick ceased chuckling, and, his gray eyes gleaming, enjoyed our discomfiture in quiet for a moment. Then he added:

"No. Strictly speaking, there is one piece of unfinished business. A matter of one murder. I was sort of dallying with the idea of committing it tonight, and finishing off the whole affair. Would you two like to be in on it?"

Miles looked as if he would like to excuse himself. He coughed, smiled unhappily, glanced doubtfully at me. I at once decided that if Frick was going to attempt murder, I was going to be on hand to prevent it. I suppose that the desperate resolution showed in my face, for Frick, looking at me, laughed outright. Miles then revived enough to smile wanly at Frick and suggest he was joking. He added:

"I'm surprised that any one with the brains you have should make so feeble a joke!"

At the word "brains" Frick almost exploded.

"Brains!" he exclaimed. "Not me! I'm dumb! Dumb as the greasy-haired saxophone player over there! I understand that I used to have brains, but that's all over; it's horrible; let's not think about it. I tell you I'm dumb, now—normally, contentedly dumb!"

Miles did not know how to understand Frick any more than did I. He reminded him:

"You used to have an I. Q. of 248——"

"I've changed!" Frick interrupted. He was still vehement, but I could see that he was full of internal amusement.

"But no healthy person's intelligence can drop much in the course of a few years," Miles objected strongly.

"Yes—I'm dumb!" Frick reiterated.

My opportunities lay in keeping him on the subject. I asked him:

"Why have you come to consider the possession of brains such an awful thing?"

"Ah, to have seen what I have seen, know what I know!" he quoted.

Miles showed irritation. "Well, then, let's call him dumb!" he said, looking at me. "To insist on such a stupid jest!"

I took another turn at arousing Frick. "You are, of course, speaking ironically out of some cryptic notion that exists only in your own head; but whatever this notion, it is absurd. Brains in quantity are the exclusive possession of the human race. They have inspired all human progress; they have made us what we are to-day, masters of the whole animal kingdom, lords of creation. Two other things have helped—the human hand and human love; but even above these ranks the human brain. You are only ridiculous when you scoff at its value."

"Oh, love and human progress!" Frick exclaimed, laughing. "Charles, I tell you brains will be the ruination of the human race," he answered with great delight.

"Brains will be the salvation of the human race!" Miles contradicted with heat.

"You make a mistake, a very common mistake, Miles," Frick declared, more seriously. "Charles is of course right in placing man at the top of creation, but you're very wrong in assuming he will always remain there. Consider. Nature made the cell, and after a time the cell became a fish; and that fish was the lord of creation. The very top. For a while. For just a few million years. Because one day a fish crawled out of the sea and set about becoming a reptile. He became a magnificent one. Tyrannosaurus Rex was fifty feet long, twenty high; he had teeth half a foot long, and feet armed with claws that were terrible. No other creature could stand against him; he had speed, size, power and ferocity; *he* became the lord of creation.

"What happened to the fish? He had been the lord of creation, but, well, he never got anywhere. What of Tyrannosaurus Rex? He, too, was the lord of creation, but he, alas, is quite, quite extinct.

"Nature tried speed with the fish, then size with the saurians. Neither worked; the fish got stuck, the saurian died off. But did she quit experimenting at that? Not at all—she tried mobility, and we got the monkey. The first monkey swung from limb to limb screeching, 'I am the lord of creation!' and, by Jove, he was! But he could not know that one day, after a few millions of years, one of his poor relations would go down on the ground, find fire, invent writing, assume clothing, devise modern inconveniences, discover he had lost his tail, and crow, 'Behold, I am the lord of creation!'

"Why did this tailless monkey have his turn? Because his make-up featured brains? You will bellow yes—but I hear Mother Nature laughing at you. For you are only her *latest* experiment! The lord of creation! That you are—but only for a little while! Only for a few million years!"

Frick paused, his eyes flashed, his nostrils distended contemptuously. "How dare man be so impertinent as to assume nature has stopped experimenting!" he exclaimed at length.

IN THE quiet which followed this surprising outburst I could see Miles putting two and two together. But he took his time before speaking. He relighted his pipe and gave it a good, fiery start before removing it from his mouth and saying, almost in a drawl:

"It amounts to this, then. Anticipating that nature is about to scrap brains and try again along new lines, you choose to attempt immortality by denying your own undoubted brains and trying to be the first to jump in the new direction."

Frick only laughed. "Wrong again, Miles," he said. "I'm just standing pat."

"To go back a little," I said to Frick; "it seems to me you're assuming far too much when you tell us that the human race is not the last, but only the most recent of nature's experiments."

The man acted almost shocked. "But have you forgotten what I told you just a little while ago? I said I have *terminated* the genus Homo Sapiens!"

Miles snorted with disgust. I was alarmed. Miles tried sarcasm.

"Have you and Mother Nature already decided, then, what the next lord of creation is to be?"

"I myself have nothing to say about it," Frick replied with assumed naïveté, "nor do I know what it will be. I could find out, but I doubt if I ever shall. It's much more fun not to know—don't you think? Though, if I had to guess," he added, "I should say she will feature instinct."

This was too much for Miles. He started to rise, saying, as he pushed his chair back, "This is enough. You're either crazy or else you're a conceited fool! Personally, I think it's both!"

But Frick held him with a gesture, and in a voice wholly sincere said:

"Sit down, Miles; keep your shirt on. You know very well I neither lie nor boast. I promise to prove everything I have said."

Miles resumed his seat and looked at Frick almost sneeringly as he went on:

"You're quite right about my being a fool, though. I was one; oh, a most gorgeous fool! But I am not conceited. I am so little conceited that I offer to show you myself in what must surely be the most ridiculous situation that a jackass or a monkey without a tail has ever been in. I'll exchange my dignity for your good opinion; you'll see that I'm not crazy; and then we'll have the most intelligent good laugh possible to Genus Homo. Yes? Shall we?"

Miles gave me a look which clearly expressed his doubt of Frick's sanity. Frick, seeing, chuckled and offered another inducement.

"And I'll throw in, incidentally, a most interesting murder!"

Our friend was completely disgusted. "We came here to eat," he said. "Let's get it over with." And with the words he picked up the menu which had been lying in front of him all this time. Frick looked at me.

"I'm not hungry," he said. "Are you?"

I wasn't. I shook my head.

"Shall we two go, then?"

I hesitated. I was not overanxious to accompany, alone, a madman on a mission of murder. But I caught Miles' eye, and like the noble he is, he said he'd come too. Frick smiled softly.

III.

TEN MINUTES later we had made the short flight along the north shore to Glen Cove, where Frick has his estate, and were escorted by him into a small, bare room on the second floor of the laboratory building which adjoins his beautiful home.

While we stood there wondering, Frick went into an adjoining room and returned with two chairs, and then, in two more trips, with a third chair and a tray on which rested a large thermos bottle and a tea service for three. The chairs he arranged facing each other in an intimate group, and the tray he set on the floor by the chair he was to take himself.

"First I have to tell a rather long story," he explained. "The house would be more comfortable, but this room will be more convenient."

Frick was now a changed man. His levity of before was gone; tense, serious lines appeared on his rugged face; his great head lowered with the struggle to arrange thoughts that were difficult, and perhaps painful, to him. When he

spoke, it was softly, in a voice likewise changed.

My dictograph was still turned on.

"Charles, Miles," Frick began, "forgive me for my conduct back in the Gardens. I had so much on my mind, and you were so smugly skeptical, that the inclination to overpower you with what I know was irresistible. I had not expected to make any of these revelations to you. I offered to on impulse; but do not fear, I shall not regret it. I think—I see now that I have been carrying a very heavy load——

"What I have to say would fill a large book, but I will make it as short as I can. You will not believe me at first, but please be patient, for proof will eventually be forthcoming. Every single thing I said to you is true, even to the murder I must commit——"

He paused, and seemed to relax, as if tired. Unknown black shadows closed over my heart. Miles watched him closely, quite motionless. We waited. Frick rubbed the flat of his hand slowly over his eyes and forehead, then let it drop.

"No," he said at length, "I have never been conceited. I don't think so. But there was a time when I was very proud of my intelligence. I worked; I accomplished things that seemed to be important; I felt myself a leader in the rush of events. Work was enough, I thought; brain was the prime tool of life; and with my brain I dared try anything. Anything! I dared try to assemble the equation of a device that would enable me to peer into the future! And when I thought I had it, I started the construction of that device! I never finished it, and I never shall, now; but the attempt brought Pearl to me——

"Yes," he added, as if necessary that he convince himself, "I am certain that had I not attempted that, Pearl would not have come. Back through the ages she had somehow felt me out—don't ask me how, for I don't know—and through me chose to enter for a brief space this, our time.

"I was as surprised as you would have been. I was working in this very room, though then it was twice as large and fairly cluttered with clumsy apparatus I have since had removed. I had been working feverishly for months; I was unshaven, red-eyed and dirty—and there, suddenly, she was. Over there, beyond that door at which I'm pointing. She was in a golden-glowing cylinder whose bottom hung two feet off the floor. For a moment she stood suspended there; and then the glow disappeared and she stepped through to the floor.

"You do not believe me? Well, of course, I don't expect you to. But there will be proof. There will be proof.

"I was surprised, but somehow I wasn't much frightened. The person of my visitor was not intimidating. She was just a barefooted young woman, very slender, of average height, clad in a shiny black shift which reached her knees. I cannot say she was well formed. Her body was too thin, her hips too narrow, her head too large. And she was miles from being pretty. Her hair and eyes were all right; they were brown; but her face was plain and flat, with an extraordinary and forbidding expression of dry intellectuality. The whole effect of her was not normal, yet certainly not weird; she was just peculiar, different—baroque.

"She spoke to me in English! In nonidiomatic English with the words run together and an accent that was atrocious! She asked severely:

" 'Do you mind too much this intrusion of mine?'

" 'Why—why no!' I said when I had recovered from the shock of the sound of her speech. 'But are you real, or just an illusion?'

" 'I do not know,' she replied. 'That is a tremondous problem. It has oc-

cupied the attention of our greatest minds for ages. Excuse me, sir.' And with these last words she calmly sat herself down on the floor, right where she was, and appeared to go off into deep thought!

"YOU CAN imagine my astonishment! She sat there for a full two minutes, while I gaped at her in wonder. When she rose again to her feet she finished with:

"'I do not know. It is a tremendous problem.'

"I began to suspect that a trick was being played on me, for all this was done with the greatest seriousness.

"'Perhaps there is a magician outside,' I suggested.

"'I am the magician,' she informed me.

"'Oh!' I said ironically. 'I understand everything now.'

"'Or no, fate is the magician,' she went on as if in doubt. 'Or no, I am—— A very deep problem'—— Whereupon she sat down on the floor and again went off into meditation!

"I stepped around her, examining her from all angles, and, since she was oblivious to everything outside of herself, I made a cursory examination of the thing she had come in on. It looked simple enough—a flat, plain, circular box, maybe four feet in diameter and six inches deep, made of a some sort of dull-green metal. Fixed to its center, and sticking vertically upward, was a post of the same stuff capped with a plate containing a number of dials and levers. Around the edge of the upper surface of the box was a two-inch bevel of what seemed to be yellow glass. And that was all—except that the thing continued to remain fixed in the air two feet off the floor!

"I began to get a little scared. I turned back to the girl and again looked her over from all sides. She was so deep in her thoughts that I dared to touch her. She was real, all right!

"My touch brought her to her feet again.

"'You have a larger head than most men,' she informed me.

"'Who are you, anyway?' I asked with increasing amazement. She gave me a name that it took me two days to memorize, so horrible was its jumble of sounds. I'll just say here that I soon gave her another—Pearl—because she was such a baroque—and by that name I always think of her.

"'How did you get in?' I demanded.

"She pointed to the box.

"'But what is it?' I wanted to know.

"'You have no name,' she replied. 'It goes to yesterday, to last year, to last thousand years—like that.'

"'You mean it's a time traveler?' I asked, astounded. 'That you can go back and forth in time?'

"'Yes,' she answered. 'I stopped to see you, for you are something like me.'

"'You wouldn't misinform me?' I asked sarcastically, feeling I must surely be the victim of some colossal practical joke.

"'Oh, no, I would not misinform you,' she replied aridly.

"I was very skeptical. 'What do you want here?' I asked.

"'I should like you to show me the New York of your time. Will you, a little?'

"'If you'll take me for a ride on that thing, and it works, I'll show you anything you want,' I answered, still more skeptical.

"She was glad to do it.

"'Come,' she commanded. I stepped gingerly up on the box. 'Stand here, and hold on to this,' she went on, indicating the rod in the center. I did so, and she stepped up to position just opposite me, and very close. I was conscious of how vulnerable I was if a joke was intended.

"'You must not move,' she warned

me. I assured her I would not. 'Then, when do you want to go?'

"'A week back,' I said at random, with, in spite of everything, a creeping sensation going up and down my spine.

"'That will do,' she decided; and again she warned me not to move. Then her hands went to the controls.

"A golden veil sprang up around us and the room grew dim through it, then disappeared. A peculiar silence came over me, a silence that seemed not so much outside of me as within. There was just a second of this, and then I was again looking into the room through the golden veil. Though it dimmed the light I could clearly make out the figure of a man stretched full length on the floor working on the under part of a piece of apparatus there.

"'It's I!' I exclaimed, and every cell in my body leaped at the miracle of it. That this could be! That I could be standing outside of myself looking at myself! That last week had come back, and that I, who already belonged to a later time, could be back there again in it! As I peered, thoughts and emotions all out of control, I saw happen a thing that stilled the last thin voice of inward doubt.

"The man on the floor rolled over, sat up, turned his face—*my* face—toward us, and, deep in thought, gently fingered a sore place on his head—from a bump that no one, positively, knew anything about. Trickery seemed excluded.

"But a contradictory thing occurred to me. I asked Pearl, 'Why doesn't he see us, since he's looking right this way? I never saw anything at the time.'

"'It is only in the next stage toward arriving that we can be seen,' she explained with her hands still on the controls. 'At this moment I'm keeping us unmaterialized. This stage is extremely important. If we tried to materialize within some solid, and not in free space, we should explode.

"'Now, let us return,' she said. 'Hold still.'

"The room disappeared; the peculiar silence returned; then I saw the room again, dim through the golden veil. Abruptly the veil vanished and the room came clear; and we stepped down on the floor on the day we had left.

"My legs were trembling so as to be unreliable. I leaned against a table, and my amazing visitor, as it seemed her habit, sat down on the floor.

"That was my introduction to Pearl."

IV.

FRICK rose and walked to the far corner of the room and back. The thoughts in his mind were causing some internal disturbance, that was obvious.

I prayed that my dictograph was working properly!

When Frick sat down again he was calmer. Not for long could any emotion sweep out of control his fine mind and dominating will. With a faint smile and an outflung gesture of his arm he said:

"That was the beginning!"

Again he paused, and ended it with one of his old chuckles. "I showed Pearl New York. I showed her!

"Charles, Miles, there is just too much," he resumed at a tangent, shaking his head. "There is the tendency to go off into details, but I'll try to avoid it. Maybe some other time. I want to be brief, just now.

"Well, I got her some clothes and showed her New York City. It was a major experience. For she was not your ordinary out-of-towner, but a baroque out of far future time. She had learned our language and many of our customs; she was most amazingly mental; and yet, under the difficult task of orienting herself to what she called our crudeness, she exhibited a most delicious naïveté.

"I showed her my laboratory and ex-

plained the things I had done. She was not much interested in that. I showed her my house, others too, and explained how we of the twentieth century live.

" 'Why do you waste your time acquiring and operating gadgets?' she would ask. She liked that word 'gadgets'; it became her favorite. By it she meant electricity, changes of clothing, flying, meals in courses, cigarettes, variety of furniture, even the number of rooms in our homes. She'd say, 'You are a superior man for this time; why don't you throw out all your material luxuries so as to live more completely in the realms of the mind?'

"I would ask her what standard she judged our civilization against; but whenever I did that she'd always go obscure, and say she guessed we were too primitive to appreciate the higher values. She consistently refused to describe the sort of civilization she had come from; though, toward the end, she began promising me that if I were a good guide, and answered all her questions, she might—only might—take me there to see it. You can imagine I was a good guide!

"But meanwhile, I got nothing but my own inferences; and what an extraordinary set I acquired from her questions and reactions! You make your own set as I go along!

"I showed her New York. She'd say, 'But why do the people hurry so? Is it really necessary for all those automobiles to keep going and coming? Do the people *like* to live in layers? If the United States is as big as you say it is, why do you build such high buildings? What is your reason for having so few people rich, so many people poor?' It was like that. And endless.

"I took her to restaurants. 'Why does everybody take a whole hour just to eat?' I told her that people enjoyed eating; it seemed not to have occurred to her. 'But if they spent only a few minutes at it they'd have that much more time for meditation!' I couldn't but agree.

"I took her to a night club. 'Why do all those men do all the carrying, and those others all the eating?' I explained that the first were waiters, the latter guests. 'Will the guests have a turn at carrying?' I told her I thought so, some day.

" 'Is that man a singing waiter?'

" 'No, only a crooner.'

" 'Why do those men with the things make such an awful noise?'

" 'Because dance bands get paid for making it.'

" 'It must be awfully hard on them.' I told her I hoped so. 'Are those people doing what you call dancing?'

" 'Yes.'

" 'Do they like to do it?'

" 'Yes.'

" 'The old ones, too?'

" 'I doubt it.'

" 'Then why do they do it?' I didn't know. At the end she asked me almost poignantly, 'Don't they *ever* spend any time in meditation?' and I had to express my doubts.

"IN OUR little jaunts it became increasingly clear to her that there was very little meditation being done in New York. It was the biggest surprise that our civilization gave her.

"However, she continued to indulge her peculiar habit of going off into meditation when something profound, or interesting, or puzzling came to her attention; and the most extraordinary thing about it was that she had to sit down at it, no matter where she was. If there was a chair handy, all right, but if not, she would plunk right down on the floor, or, outside, even in the street! This was not so bad when we were alone, but once it happened under Murphy's flagpole in Union Square as we stood observing the bellowings of a soap-box orator, and once again in

Macy's, where we lingered a moment listening to a demonstrator with the last word possible in beauty preparations. It was quite embarrassing! Toward the end I grew adept in detecting signs of the coming descent and was fairly successful in holding her up!

"In all the six days I spent showing Pearl New York, not once did she show any emotion other than that of intellectual curiosity; not once did she smile; not once did she so much as alter the dry expression on her face. And *this,* my friends, was the creature who became a student and an exponent of love!

"It bears on my main theme, so I will tell you in some detail about her experiences with love, or what she thought was love.

"During the first three days she did not mention the word; and from what I know of her now, I can say with surety that she was holding herself back. During those three days she had seen one performance of 'Romeo and Juliet,' had read two romantic novels containing overwhelming love themes, had observed everywhere the instinct for young people to seek each other out, had seen two couples kiss while dancing, had seen the fleet come in and the sailors make for Riverside Drive, and had heard I don't know how many hours of crooning on radio broadcasts.

"After all this, one day in my drawing-room, she suddenly asked me, 'What is this love that every one is always talking about?'

"Never dreaming of the part love was to play between us, I answered simply that it was nature's device to make mature humans attractive to each other and insure the arrival of offspring and the maintenance of the race. That, it seems, is what she thought it was, but what she couldn't understand was why everybody made such a to-do about it. Take kissing, for instance. That was when a male and a female pushed each other on the lips. Did they like that? I assured her they did. Was it, since they held it so long, a kind of meditation? Well, no, not exactly. Would I try it with her?

"Don't smile yet, you two—that's nothing! Wait! Anyway, you wouldn't want me to spoil my chances of being taken for a visit to her own time, would you?

"Well, we kissed. She stood on tiptoe, her dry face looking up at mine, her arms stiffly at her sides, while I bent down, my sober face looking down at hers, and my arms stiffly at my sides. We both pushed; our lips met; and we stayed that way a little. Then, almost maintaining contact, Pearl asked me, 'Is it supposed to sort of scrape?' I assured her it was—something like a scrape. After a moment she said, 'Then there's a great mystery here, somewhere——' And damned if she didn't squat right down on the floor and go off into a think! I couldn't keep a straight face, so I bounced out of the room; and when I returned several minutes later there she was still meditating on her kiss. *O tempora!*

"That kiss happened on the third day, and she stayed six, and for the remainder of her visit in our time she said not one thing more about this thing called love—which told me it was a mystery always on her mind, for she asked questions by the score about every other conceivable thing.

"But I also knew from another thing. For the three days following that kiss she went innumerable times to my radio and tuned in dance and vocal programs whose songs would, of course, inevitably be about love. She fairly saturated herself with love's and above's, star's and are's, blue's and you's, June's and moon's. What a horrible flock of mangy clichés must have come to flap around in her mental—all too mental—mind! What peculiar notions about love they must have given her!

"But enough of that phase. You have an idea. You have seen Pearl in New York, tasting of love. Six nights to the very hour after she first appeared to me I stood again on the round base of the time traveler, and this time I accompanied her forward to her time. I do not know how far in the future that was, but I estimate it to be around three million years."

V.

FRICK PAUSED, rose, and, without asking us if we wanted any, served some cold tea from the thermos bottle by his chair. This time we were glad to have it.

By then I was as close to fully believing as was, I think, Miles. We wasted little time over the tea, but, considerably refreshed and extremely eager with anticipations of what would follow, leaned forward and were again lost in Frick's extraordinary story.

"The trip forward took what seemed to be only half a minute, and I believe it might have been instantaneous but for the time needed to bring the machine to a stop on exactly the right day. As before, the passage was a period of ineffable silence; but I was aware that all the time Pearl fingered the controls. Very suddenly I saw we were in a dimly-lighted room; with equal suddenness the golden screen vanished and normal daylight took its place. We had arrived.

"I stepped off the traveler and looked curiously about. We were in a small place, the walls of which were partitions which projected perhaps ten feet up toward a very high ceiling. Everything I could see was made of an ugly, mud-yellow metallic substance, and everything seemed to be built on the square. Light entered from large windows on all sides. The section of the great room in which we had arrived was bare of everything but our traveler. I saw that this time it rested firmly on the floor—a very dirty floor.

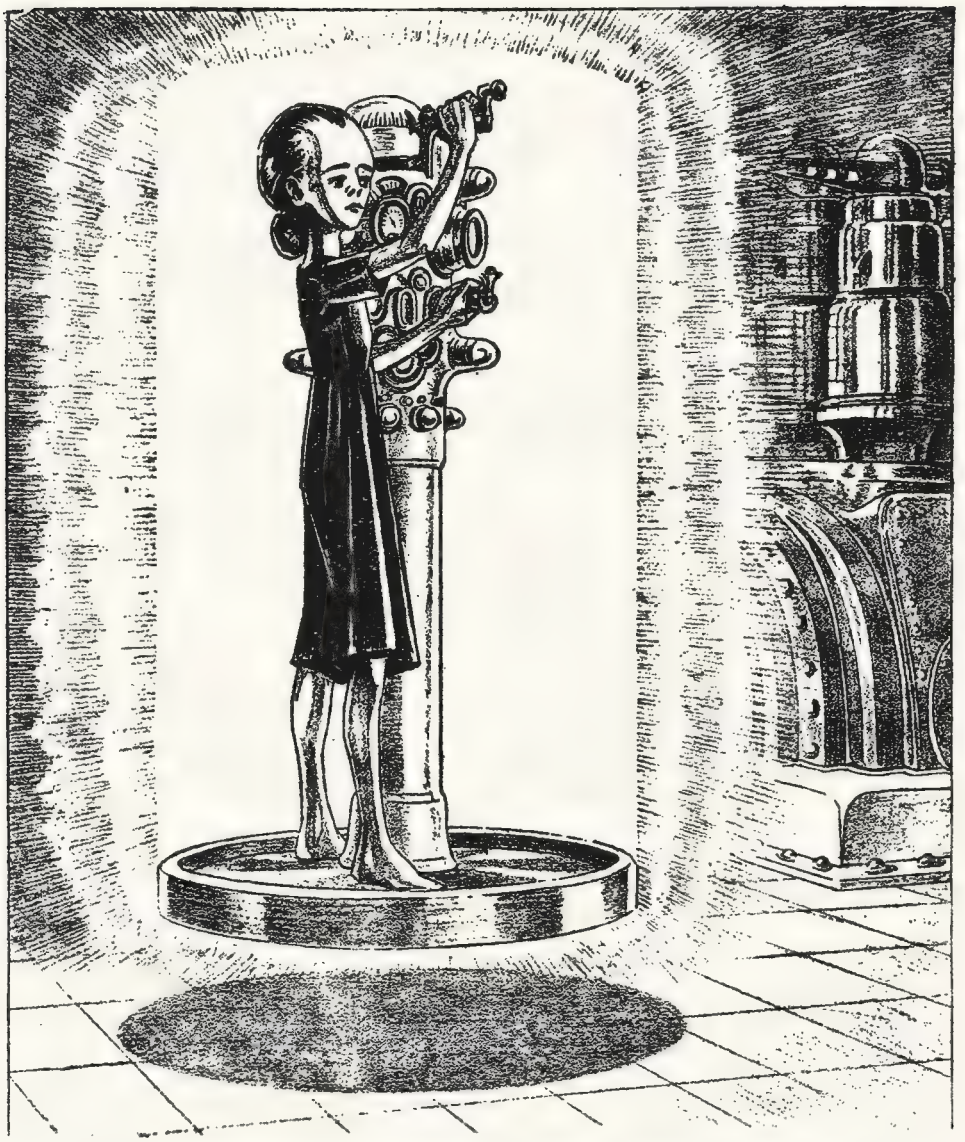
"I suppose it would be superfluous to paint the tremendous state of excitement and curiosity I was in. To be the only man of our time to have voyaged forward! To be the only one allowed to see the human race in marvelous maturity! What honor, glory, luck, that such an unmerited distinction should fall upon me! Every atom of my body was living and tingling at that moment. I was going to drink in and remember everything that crossed my senses.

"I was full of questions at once, but Pearl had warned me not to talk. She had told me that there were several caretakers from whose sight I was to remain hidden; and now the first thing she did was to put her finger to her lips and peer down the corridor outside. She listened a moment, then stepped out and beckoned me to follow.

"I did—and all but exclaimed out loud to see that the corridor was carpeted with fine dust fully an inch deep!

"How could this be in an important building of so advanced an age? For surely that building was important, to house, as it did, so marvelous a device as the traveler!

"But I had no time for wonderment, for Pearl led me rapidly toward the far side of the great room. At our every step clouds of dust billowed out on each side, so that a hasty glance behind showed such diffusion of it that all there was hidden. The corridor was quite wide, and ran lengthwise of the building on one side of the center. At varying distances we passed doorways, all of them closed, and at the end we turned to the left, to come quickly to a high, wide door. It was open, and golden sunlight was shining through. For a second Pearl held me back while she peered around the edge, then, taking me by the hand, she led me out into our world of the future.



She was in a golden-glowing cylinder whose bottom hung two feet off the floor. For a moment she stood, suspended, then the glow disappeared, and——

"What would you have expected to see, Charles? You, Miles? Towering buildings, perhaps, transversed on their higher levels by aërial traffic ways? And crowds of people strangely mannered and curiously dressed? And mysterious-powered aërial carriers? And parks? And flowers? And much use of metal and synthetic marble? Well, of these there was nothing. My eyes looked out over a common, ordinary, flat, 1963 field. In the distance were

some patches of trees; near by were some wild grass, low bushes, and millions of daisies; and that was all!

"My first thought was that Pearl had made some mistake in our time of destination, and when I sought her face, and saw that this was only what she expected, I grew alarmed. She misread my thoughts, though, and saying 'Don't be afraid,' led me along a wide walk to a corner of the building, where she peeped around the edge, and, apparently satisfied with what she found, stepped forth and motioned me to follow. Then she spoke:

" 'Here we are,' she said.

"BEFORE ME stretched the same sort of landscape as on the other quarter, except that here the immediate field

was tenanted with a square block of large metallic boxes, six on a side, and each separated by about ten yards from its neighbors.

"I suppose I stood there and gaped. I didn't understand, and I told Pearl as much. Her tone in replying came as near surprise as I ever heard it.

" 'Not understand?' she asked. 'What do you mean? Isn't this just about what you expected?'

"Eventually I found words. 'But where is your city?' I asked.

" 'There,' she answered, with a gesture of her arm toward the boxes.

" 'But the people!' I exclaimed.

" 'They are inside.'

" 'But I—I—there's something wrong!' I stammered. 'Those things are no city, and they couldn't hold ten people apiece!'

" 'They hold only one apiece,' she informed me with dignity.

"I was completely flabbergasted. 'Then—then your total population is——'

" 'Just thirty-six, out here; or, rather, thirty-five, for one of us has just died.'

"I thought I saw the catch. 'But how many have you that aren't out here?'

" 'Just us younger ones—four, including myself,' she answered simply. She added, 'And, of course, the two who are not yet born.'

"All before this had turned my head; her last statement came near turning my stomach. Clutching at straws, I blurted out:

" 'But this is just a small community; the chief centers of your population lie elsewhere?'

" 'No,' she corrected levelly, 'this is the only center of our civilization. All human beings are gathered here.' She fixed me with her dry gaze. 'How primitive you are!' she said, as a zoölogist might, looking at a threadworm. 'I see that you expected numbers, mere numbers. But I suppose that a comparative savage like you might be expected to prefer quantity of life to quality of life.

" 'We have here quality,' she went on with noble utterance, '—the finest of the finest, for ten thousand generations. Nature has need of quantity in her lower orders, but in allowing the perfection of such towering supermen as are my friends out here she has indulged in the final luxury of quality.

" 'Nor is that all. With quality we have at last achieved simplicity; and in the apotheosis of humanity these two things are the ultimates.'

"All I could do was mumble that simplicity was too weak a word."

Frick stopped here, laughed, and rose. "She had my mind down and its shoulders touching! And from that moment —I assure you, my friends—the whole thing began to amuse me."

He took a few steps about the room, laughing silently; then, leaning with one shoulder against the wall, he went on:

"Pearl was on an awfully high horse, there, for a moment, but she soon dismounted and considered what she might offer for my entertainment. She expressed polite regret that her civilization contained so little for me to see with my eyes. She implied that the vast quantities of intellectual activity going on would be far past my understanding.

"I asked, then, if there was any way I might have a peep at their quality group in action; and to this she replied that her countrymen never came together in groups, and neither did they indulge in actions, but that it would be easy to show me one or two of the leading citizens.

"I of course told her I did not want her to run a risk of getting in trouble, but she assured me there was no danger of that. The guardians of the place—they were the three other 'younger ones' she had just mentioned—were quiet

somewhere, and as for the adults, 'They,' she said, 'will be able neither to see nor hear you.'

"Well, she showed me two. And merciful heavens!"

FRICK laughed so that for a moment he could not go on. Miles by now was reflecting Frick's every mood, and would smile in anticipation when he laughed. I suppose I was doing the same. We were both completely under Frick's spell.

"She escorted me openly across the field to the nearest box, and I remember that on the way I got a bur in my ankle which I stopped to remove. I found from close up that the boxes were about ten feet square and made of the same ugly yellow metal used in the big building. The upper part of each side had a double row of narrow horizontal slits, and in the middle of each front side there was a closely-fitted door. I was remembering Pearl's promise that they would be able neither to see nor hear me, so I was alarmed when without ceremony she opened the door and half pushed me in.

"What I saw! I was so shocked that, as Pearl told me later, I gasped out an involuntary 'Oh!' and fairly jumped backward. Had she not been right behind and held me, I might have run. As it was I remained, hypnotized by sight of what met my eyes, trembling, and I think gagging.

"I saw a man; or some kind of a man. He sat right in front of me, nude from the waist up, and covered as the floor was covered from the waist down. How shall I adequately describe him!

"He was in some ways like an unwrapped mummy, except that a fallen-in mummy presents a fairly respectable appearance. And then he was something like a spider—a spider with only three legs. And again, looking quickly, he was all one gigantic head, or at least a great mass on whose parchment surface appeared a little round two-holed knoll where the nose customarily is, lidded caverns where the eyes belong, small craters where the ears commonly are, and, on the under side, a horrible, wrinkled, half-inch slit, below which more parchment backed almost horizontally to a three-inch striated and, in places, bumpy pipe.

"By not the slightest movement of any kind did the monster show he knew I was there. He sat on a high dais; his arms were only bones converging downward; his body, only half the usual thickness, showed every rib and even, I think, the front side of some of his vertebrae; and his pipe of a neck, unable alone to support his head, gave most of that job to two curved metal pieces that came out of the wall.

"He had a musty smell.

"And, final horror, the stuff that covered him to the waist was dust; and there were two inches of dust on the top of his head and lesser piles of it on every little upper surface!

VI.

"IT WAS horrible; but I swear that as I stood there goggling at him he began to strike me funny. It grew on me, until I think I should have laughed in the old gent's face had I not been restrained by a slight fear that he might in some way be dangerous.

"Goodness knows what all I thought of as I stood there. I know I eventually asked Pearl, for caution's sake:

"'You're sure he can't see or hear me?'

"She told me he could not.

"I was not surprised; he looked too old for such strenuous activities. I scrutinized him, inch by inch. After a little I announced with conviction:

"'He's dead! I'm sure of it!'

"She assured me he was not.

"'But look at the dust! He can't have moved for years!'

"'Why should he move?' she asked.

"That stopped me for a little.

"'But—but,' I stammered eventually, 'he's as good as dead! He's not doing anything!'

"'He certainly is doing something,' was her dignified correction. 'He's meditating.'

"All I could think to say was 'Good-night!'

"At that, Pearl turned on me reproachfully. 'Your attitude is bestial,' she said. 'I have done you the honor of bringing you to witness the highest flowering of the human race, and you act like a pig. Life can hold nothing more beautiful than this man you see here; he is the ultimate in human progress, one who is in truth perfection, whose every taint of animal desire has been cleaned away, who is the very limit in the simplicity of his life and the purity of his thoughts and intentions.'

"Not to miss anything she added, 'He embodies the extension of every quality that makes for civilization; he's reached the logical end of man's ambitious climb up from the monkey.'

"'My Lord!' I said. 'Here's a dead end!'

"'For myself, I sum it all in five words,' she went on nobly: 'He leads the mental life.'

"After a little my emotions suddenly got out of control. 'Does—does he *like* it?' I blurted out. But that was a mistake. I tried: 'Do you mean to imply he spends his life sitting here and thinking?'

"'Pure living and high thinking,' she put it.

"'No living, I'm thinking!' I retorted. 'What does he think of?'

"'He is probably our greatest æsthetician,' she answered proudly. 'It's a pity you can't know the trueness and beauty of his formulations.'

"'How do you know they are beautiful?' I asked with my primitive skepticism.

"'I can hear his thoughts, of course,' was the answer.

"This surprising statement started me on another string of questions, and when I got through I had learned the following: This old bird and the others could not hear me think because my intellectual wave length was too short for their receivers; that Pearl, when talking and thinking with me, was for the same reason below their range; and that Pearl shared with the old guys the power of tuning in or out of such private meditations or general conversations as might be going on.

"'We utilize this telepathic faculty,' Pearl added, 'in the education of our young. Especially the babies, while they are still unborn. The adults take turns in tutoring them for their cells. I, it happens, was a premature baby—only eleven months—so I missed most of my prenatal instruction. That's why I'm different from the others here, and inferior. Though they say I was bad material all the way back from conception.'

"Her words made my stomach turn over, and the sight of that disproportioned cadaver didn't help it any, either. Still I stood my ground and did my best to absorb every single detail.

"While so engaged I saw one of the most fantastic things yet. The nasty little slit of a mouth under our host's head slowly separated until it revealed a dark and gummy opening; and as it reached its maximum I heard a click behind my back and jumped to one side just in time to see a small gray object shoot from a box fastened to the wall, and, after a wide arc through the air, make a perfect landing in the old gentleman's mouth!

"'He felt the need for some sustenance,' Pearl explained. 'Those pellets contain his food and water. Naturally he needs very little. They are ejected by a mechanism sensitive to the force of his mind waves.'

" 'Let me out,' I said.

"We went out into the clean, warm sunshine. How sweet that homely field looked! I sat down on the grass and picked a daisy. It was not one whit different from those of my own time, at home.

"Pearl sat down beside me.

" 'We now have an empty cell,' she said, 'but one of our younger men is ready to fill it. He has been waiting until we installed a new and larger food receptacle—one that will hold enough for seventy-five years without refilling. We've just finished. It is, of course, the young of our community who take care of the elders by preparing the food pellets and doing what other few chores are necessary. They do this until they outgrow the strength of their bodies and can no longer get around—when they have the honor of maturity and may take their place in one of the cells.'

" 'But how in the devil do creatures like—like that in there, manage to have children?' I had to ask.

" 'Oh, I know what you mean, but you've got the wrong idea,' came her instant explanation. 'That matter is attended to while they are still comparatively young. From the very beginning the young are raised in incubators.'

"I have always had a quick stomach —and she insisted on trying to prove it!

" 'With us, it takes fifteen months,' she went along. 'We have two under way at present. Would you like to see them?'

"I told her that I would see them, but that I would not like it. 'But first,' I asked, 'if you don't mind, show me one other of these adults of yours. I—I—I can't get over it. I still can't quite believe it.'

"She said she would. A woman. And at that we got up and she led me to the next cell.

"I did not go in. I stood outside and took one look at the inmate through the door. Horrible! Female that she was, it was at that moment I first thought what a decent thing it would be—yes, and how pleasant—to hold each one of the necks of those cartoons of humankind in the ring of my two strong hands for a moment——

"But I was a trusted visitor, and such thoughts were not to be encouraged. I asked Pearl to lead on to the incubators.

"We had left the block of cells and were rounding the corner of the building when Pearl stopped and pulled me back. Apparently she had gotten some thought warning just in time, for in a moment three outlandish figures filed out of the very door of the big building that we had been making for. All wore black shiny shifts like Pearl's, and they were, very obviously, young flowers of Genus Homo in full perfection.

"THE FIRST was the size, but had not nearly the emaciated proportions, of the old æsthetician, and his great bald head wabbled precariously on his outrageous neck as he made his uncertain way along. The second—a girl, I think—was smaller, younger, stronger, but she followed her elder at a respectful distance in the same awful manner. The third in the procession was a male, little more than a baby, and he half stumbled after the others in his own version of their caricature of a walk.

"They walked straight out into the field; and do you know, that little fellow, pure monster in appearance, ugly as ultimate sin, did a thing that brought tears to my eyes. As he came to the edge of the walk and stepped off into the grass, he bent laboriously over and plucked a daisy—and looked at it in preoccupied fashion as he toddled on after the others!

"I was much relieved that they had not discovered us, and so was Pearl. As soon as they were a safe distance away, she whispered to me:

" 'I had to be careful. They all can

see, and the two younger ones still can hear.'

"'What are they going to do out there?' I asked.

"'Take a lesson in metaphysics,' she answered, and almost with her words the first one sat down thoughtfully out in the middle of the field—to be followed in turn by the second and even the little fellow!

"'The tallest one,' Pearl informed me, 'is the one who is to take a place in the vacant cell. He had better do it soon. It's becoming dangerous for him to walk about. His neck's too weak.'

"With care we edged our way up and into the building, but this time Pearl conducted me along the corridor on the other side. The dust there was as thick as in the first, except along the middle, where many footprints testified to much use. We came to the incubators.

"There I saw them. I saw them; I made myself look at them; but I tell you it was an effort! I—I think, if you don't mind, I won't describe them. You know—my personal peculiarity. They were wonderful. Curvings of glass and tubes. Two, in them. Different stages. I left right away; went back to the front door; and in a few minutes felt better.

"Pearl, of course, had to come after me and try to take me back; and I noticed an amusing thing. The sight of those coming babies had had a sort of maternal effect on her! I swear it! For she *would* talk about them; and before long she timidly—ah, but as dryly as ever!—suggested that we attempt a kiss!—only she forgot the word and called it a scrape. Ye gods! Well, we scraped—exactly as before—and that, my friends, was the incident which led straight and terribly to the termination of the genus Homo Sapiens!

"You could never imagine what happened. It was this, like one-two-three: Pearl and I touched lips; I heard a soft, weird cry behind me; I wheeled; saw, in the entrance, side by side, the three creatures I had thought were safely out in the field getting tutored; saw the eldest's face contort, his head wabble; heard a sharp snap; and then in a twinkling he had fallen over on the other two; and when the dust had settled we saw the young flowers of perfect humanity in an ugly pile, and they lay still, quite still, with, each one, a broken neck!

"They represented the total stock of the race, and they were dead, and I had been the innocent cause!

"I was scared; but how do you think their death affected Pearl? Do you think she showed any sign of emotion? She did not. She ratiocinated. She was sorry, of course—so her words said—the tallest guy had been such a beautiful soul!—a born philosopher!—but it had happened; there was nothing to do about it except remove the bodies, and now it was up to her alone to look after the incubators and that cemetery of thinkers.

"'But first,' she said, 'I'd better take you back to your time.'

"'But no!' I said, and I invented lots of reasons why I'd better stay a little. Now that there was no one to discover my presence I more than ever did not want to go. There were a hundred things I wanted to study—the old men, how they functioned, the conditions of the outside world, and so on—but particularly, I confess, I wanted to examine the contents of that building. If it could produce a time traveler, it must contain other marvels, the secrets of which I might be able to learn and take back home with me.

"We went out into the sun and argued, and my guide did a lot of squatting and meditating, and in the end I won out. I could stay three days.

"On the afternoon of the first day something went wrong with the incubators, and Pearl came hurrying to tell

me in her abstracted fashion that the two occupants, the last hopes of the human race, were dead.

"She did not know it, but I had done things to the mechanisms of the incubators.

"I had murdered those unborn monsters——

"Charles, Miles, let's have some more tea."

VII.

FRICK went over to the thermos bottle, poured for us, returned it to the floor, and resumed his chair. We rested for several minutes, and my dictograph shows that again not a word was spoken. I will not try to describe my thoughts except to say that the break in the tension had found me in need of the stimulation I was given.

When Frick resumed, it was suddenly, with unexpected bitterness and vehemence.

"Homo Sapiens had become a caricature and an abomination!" he exclaimed. "I did not murder those unborn babies on impulse, nor did I commit my later murders on impulse. My actions were considered; my decisions were reached after hours of the calmest, clearest thinking I have ever done; I accepted full responsibility, and I still accept it!

"I want now to make a statement which above all I want you to believe. It is this. At the time I made up my mind to destroy those little monsters, and so terminate Genus Homo, I expected to bring Pearl back to live out her years in our time. That was the disposition I had planned for her. Her future did not work out that way. To put it baldly, Mother Nature made the most ridiculous ass of all time out of me; but remember, in justice to me, that the current of events got changed *after* my decision.

"I have said that Pearl took the death of the race's only young stock in her usual arid manner. She certainly did; but, as I think back over those days, it seems to me she did show a tiny bit, oh, a most infinitesimal amount, of feeling. That feeling was directed wholly toward me. You may ask how she could differ temperamentally—and physically—from those others, but I can only suggest that the enigma of her personal equation was bound up in the unique conditions of her birth. As she said, she may have been 'bad material' to start with. Then, something had gone wrong with an incubator; she was born after only eleven months; was four months premature; had received remote prenatal tutoring for that much less time; and had functioned in a different and far more physical manner much earlier, and with fewer built-in restraints, than the others.

"It was this difference in her, this independence and initiative, that caused her to find the time traveler, the unused and forgotten achievement of a far previous age. It was this difference that allowed her to dare use it in the way we know. And it was this difference—now I am speaking chiefly of her *physical* difference—that gave rise in me to the cosmic ambitions which took me from farce to horror, and which I will now try to describe.

"Toward the evening of the second day we sat out on the wold grass before that corroboree of static philosophers and discussed the remaining future of the human race.

"I argued, since there was no one else to look after them now, and since they could live only as long as she lived, it was clear that the best thing—and, in the event of accident to her, the most humane thing—would be for me to kill them all as painlessly as possible and take her back to my time to live.

"I need not mention the impossibility of there being any more descendants from them.

"But for the only time during all the period I knew her she refused to face

the facts. She wouldn't admit a single thing; I got nowhere; argue and plead as I would, all she would say, over and over, was that it was a pity that the human race had to come to an end. I see now that I was dense to take so long to get what she was driving at. When I did finally get it I nearly fell over backward in the grass.

"My friends, she was delicately hinting that I was acceptable to her as the father of a future race!

"Oh, that was gorgeous! I simply couldn't restrain my laughter; I had to turn my back; and I had a devil of a time explaining what I was doing, and why my shoulders shook so. To let her down easily, I told her I would think it over that night and give her my decision in the morning. And that was all there was to it at the time.

"Now comes the joke; now comes the beginning of my elevation to the supreme heights of asshood, and you are at liberty to laugh as much as you please. That night, under the low-hung stars of that far future world, I *did* decide to become the father of a future race! Yes—the single father of ultimate humanity!

"That night was perhaps the most tremendous experience of my life. The wide thinking I did! The abandoned planning! What were not the possibilities of my union with Pearl! She, on her side, had superb intellectuality, was the product of millions of years' culture; while I had emotion, vitality, the physicalness that she and the withered remains of her people so lacked! Who might guess what renaissance of degenerated humanity our posterity might bring! I walked, that night; I shouted; I laughed; I cried. I was to become a latter-day god! I spent emotion terrifically; it could not last till dawn; morning found Pearl waking me, quite wet with dew, far out in the hills.

"I had settled everything in my mind. Pearl and I would mate, and nature would take her course; but there was one prime condition. There would have to be a house cleaning, first. Those cartoons of humanity would have to be destroyed. They represented all that was absurd and decadent; they were utterly without value; they were a stench and an abomination. Death to the old, and on with the new!

"I told Pearl of my decision. She was not exactly torrid with gratitude when she heard me say I would make her my wife, but she did give some severely logical approval, and that was something. She balked, however, at my plan to exterminate her redoubtable exponents of the mental life. She was quite stubborn.

"All that day I tried to convince her. I pointed out the old folks' uselessness; but she argued they were otherwise; that usefulness gives birth to the notion of beauty; that, therefore, beauty accompanies usefulness; and that because the old gentlemen were such paragons of subjective beauty they were, therefore, paragons of usefulness. I got lost on that airy plane of reasoning. I informed her that I, too, was something of an æsthetician, and that I had proved to myself they smelled bad and were intolerable; and how easy it would be to exterminate them!—how slender their hold on life!

"Nothing doing. At one time I made the mistake of trying vile humor. Here's a splendid solution of the in-law problem! As if she could be made to smile! She made me explain what I had meant! And this seemed to give her new thinking material, and resulted in her going down into squat-thinks so often that I was almost ready to run amuck.

"I suppose there must be a great unconscious loyalty to race in humans, for even in that attenuated time Pearl, unsentimental as she always was, doggedly insisted that they be allowed to live out their unnatural lives.

"I never did persuade her. I forced

her. Either they had to go or I would. Late that night she gave me her permission.

"I AWOKE the morning of the fourth day in glorious high spirits. This was the day that was to leave me the lord of creation! I was not at all disturbed that it entailed my first assuming the office of high executioner. I went gayly to meet Pearl and asked her if she had settled her mind for the work of the day. She had. As we breakfasted on some damnable stuff like sawdust we talked over various methods of extermination.

"Oh, I was in splendid spirits! To prove to Pearl that I was a just executioner, I offered to consider the case of each philostatician separately and to spare any for whom extenuating circumstances could be found. We started on the male monster of my first day. Standing before him in his cell I asked Pearl:

" 'What good can you say of this alleged æsthetician?'

" 'He has a beautiful soul,' she claimed.

" 'But look at his body!'

" 'You are no judge,' she retorted. 'And what if his body does decay?—his mind is eternal.'

" 'What's he meditating on?'

"Pearl went into a think. After a moment she said, 'A hole in the ground.'

" 'Can you interpret his thoughts for me?' I asked.

" 'It is difficult, but I'll try,' she said. After a little she began tonelessly, 'It's a hole. There is something—a certain something about it—— Once caught my leg in one—— I pulled. Yes, there is something—ineffable—— So-called matter around—air within—— Holes—depth — moisture — leaks — juice—— Yes, it is the *idea* of a hole—— Hole—inverse infinity—holiness——'

" 'That'll do!' I said—and pulled the receptacle of all this wisdom suddenly forward. There was a sharp crack, like the breaking of a dry stick, and the receptacle hung swaying pendulously against his ribs. 'Justice!' I cried.

"The old woman was next. 'What's there good about her?' I asked.

" 'She is a mother,' Pearl replied.

" 'Enough!' I cried, and the flip of my arm was followed by another sharp crack. 'Justice to the mother who bore Homo Sapiens! Next!

"The next was an awful-looking wreck—worse than the first. 'What good can you say of him?' I asked.

" 'He is a great scientist.'

" 'Can you interpret his thoughts?'

"Pearl sunk and thunk. 'Mind force ——' she said tonelessly. 'How powerful—mm—yes, powerful—— Basis of everything living—mm—really is everything—no living, all thinking—in direct proportion as it is not, there is nothing—— Mm, yes, everything is relative, but everything together makes unity—therefore, we have a relative unit—or, since the reverse is the other half of the obverse, the two together equal another unity, and we get the equation: a relative unit equals a unit of relativity—— Sounds as if it might mean something. Einstein was a primitive. I agree with Wlyxzso. He was a greater mind than Yutwlxi. And so it is proved that mind always triumphs over matter——'

" 'Proved!' I said—and crack went his neck! 'Justice!' I cried. 'Next!'

"The next, Pearl told me, was a metaphysician. 'Ye gods' I cried; 'don't tell me that among this lot of supermetaphysicians there is a specialist and an ultra. What's he thinking?'

"But this time poor Pearl was in doubt. 'To tell the truth we're not sure whether he thinks or not,' she said, 'or whether he is alive or dead. Sometimes we seem to get ideas so faint that we doubt if we really hear them; at others there is a pure blank.'

" 'Try,' I ordered. 'Try hard. Every last dead one must have his chance to be killed.'

"She tried. Eventually she said, 'I really think he is alive—— Truth—air—truth firmly rooted high in air—ah, branching luxuriantly down toward earth—but never touching, so I cannot quite reach the branches, though I so easily grasp the roots——'

"Crack! went his neck.

"I cracked a dozen others. It got easier all the time. Then Pearl presented me to the prize of the collection. He had a head the size of a bushel basket.

" 'What good can you say of him?'

" 'He is the greatest of us all, and I do beg that you will spare him,' was her reply. 'I don't know what his specialty is, but every one here regarded him so highly!'

" 'What is he thinking?' I asked.

" 'That's it,' she replied. 'No one knows. From birth he has never spoken; he used to drool at the mouth; no one has been able to detect any sign of cerebration. We put him in a cell very early. One of us gave an opinion that he was a congenital hydrocephalic idiot, but that was an error of judgment, for the rest of us have always been sure that his blankness is only apparent. His meditations are simply beyond our gross sensibilities. He no doubt ponders the uttermost problems of infinity.'

" 'Try," I said. 'Even he gets his chance.'

"Pearl tried, and got nothing. Crack! went his neck.

"And so it went. One by one, with rapid dispatch, and with a gusto that still surprises me when I think of it, I rid the earth of its public enemies. By the time the sun was high in the heavens the job was complete, and I had become the next lord of creation!

VIII.

"THE EFFECT of the morning's work sent Pearl into a meditation that lasted for hours. When she came out of it she seemed her usual self; but inside, as I know now, something was changed, or, let us say, accelerated; and when this acceleration had reached a certain point my goosish ambition was ignominiously cooked. Ah, and very well cooked! Humorous and serious—I was well done on both sides!

"But realization of my final humiliation came late and suddenly. My thoughts were not at all on any danger like that, but on millions of darling descendants in whose every parlor would hang my picture, when Pearl came out of her extended trance.

"I had decided to be awfully nice to her—a model father even if not the perfect lover—so it was almost like a courtier that I escorted her out on the field and handed her over to a large stone, where she promptly sat and efficiently asked what I wanted. I imagined she showed a trace of disappointment when I told her I only wished to talk over some arrangements relative to our coming civilization; but she made no remark, let me paint a glowing picture of the possibilities, and agreed with me on the outlines of the various plans I had formed.

"I was in a hurry. I asked her if she desired to slip back to my time to have the ceremony performed.

"This offer was, I thought, a delicate gesture on my part. She came back with what amounted to a terrific right to the heart. She said severely:

" 'Yes, Frick, I will marry you, but first, you must court me.'

"Observe, now, Miles, and you, Charles, my rapid ascent to asshood's most sublime peak. Countless other men have spent their lives trying to attain that dizzy height; a few have almost reached its summit, but it remained for me, the acting lord of creation, to achieve it. For—there was nothing else to do about it—I began to court her!

" 'Hold my hand,' she said—and I held her hand. She thought. 'Tell me

that you love me,' she required. I told her that I loved her. 'But look at me when you say it,' she demanded—and I looked into her fleshless face with the thin lips that always reminded me of alum and said again that I loved her. Again she took thought, and I got the impression that she was inspecting her sensations. 'Kiss me,' she ordered; and when I did she slid to the ground in a think!

"'There are mysteries in there somewhere,' she said when I pulled her up. 'I shall have to give a great deal of thought to them.'

"I was in a hurry! I told her—Lord forgive me!—that she was clearly falling in love with me! And within herself she found something—I can't imagine what—that encouraged the idea. I struck while the iron was—well, not at absolute zero.

"'Oh, come on,' I urged her. 'You see how we love each other; let's get married and get it over with.'

"'No, you'll have to court me,' she answered, and I'll swear she was being coy. 'And court me for a long time, too,' she added. 'I found out all about it, in your time. It takes months.'

"This was terrible! 'But why wait? Why? We love each other. Look at Romeo and Juliet! Remember?'

"'I liked that young man Rudy better,' she came back at a tangent.

"'You mean the man in the night club?' I asked.

"'Yes,' she answered. 'He seemed to be singing just to me.'

"'Not singing—crooning!' I corrected irritably.

"'Yes, crooning,' she allowed. 'You croon to me, Frick.'

"Imagine it! Me, of all people; she, of all people; and out in the middle of that field in broad daylight!

"But did I croon? I crooned. You have not seen me at the heights yet!

"'More,' she said abstractedly. 'I think I feel something.'

"I crooned some more.

"'Something with love and above in it,' she ordered.

"I made up something with love and above in it.

"'And something with you and true,' she went on.

"I did it.

"'Now kiss me again.'

"And I did that!

"Thank Heaven she flopped into another think! I escaped to the woods while she was unconscious, and did not see her again till the next day.

"My friends, this was the ignoble pattern of my life for the two weeks that followed.

"I suffered; how I suffered! There I was, all a-burning to be the author of a new civilization, luxuriating in advance at thought of titanic tasks complete; and there she was, surely the most extraordinary block to superhuman ambition that ever was, forever chilling my ardor, ruthlessly demanding to be courted! I held hands with her all over that portion of time; I gazed into her eyes at the tomb of old Hydrocephalus himself; I crooned to her at midnight; and I'll bet that neighborhood was pitted for years in the places she suddenly sat down to meditate on in the midst of a kiss!

"She had observed closely—all too closely—the technique of love overtures here in our time, and noted particularly the effect on the woman, so she must needs always be going off into a personal huddle to see if, perhaps, she was beginning to react in the desired manner!

"Ah, there was brains! How glad I am that I'm dumb!

"I BEGAN to lose weight and go around tired. I saw that our courtship could go on forever. But she saved me with an idea she got out of one of those novels she had read. She told me one rainy morning, brightly, that it might be a good thing if we did not see each

other for a couple of months. She had so very, very much to think over, and, incidentally, how sorry she was for her poor countrymen who had died without dreaming life could hold such wealth of emotional experience as she had accumulated from me!

"By then I was as much as ever in a rush to get my revised race off under their own power, but I was physically so exhausted that my protests lacked force, and I had to give in. So we made all arrangements and had our last talk. It was fully understood that I was to come back in two months and take her as my bride. She showed me how to operate the traveler. I set the controls, and in a matter of a minute I was back here in this room.

"But I tricked her. That is, in a sense. For I didn't wait two months. The idea occurred to me to straddle that period in the traveler—so in only another minute I was materializing in the time two months away that I was to call back and claim her! I was thankful for that machine, for the long ordeal had left my body weak and my nerves frazzled, and I don't know how I could have stood so long a delay. You see, I was in such a hurry!

"Ah, had I known! The catastrophe was already upon me! Note its terrible, brief acceleration!

"When I arrived, all was exactly as before. The great building was as dusty, the community as deserted, the block of cells just as morbid as when I left. Only the fields had changed. I found Pearl sitting before the tomb of Hydrocephalus, meditating.

" 'I'm surprised to find you back so soon,' were her words of greeting. 'It seemed only a week.'

" 'Did you have a good time, my Pearl-of-great-price?' I asked tenderly. (She had come to insist on that name. Once, near despair, I had used it with a different meaning, and afterward she required me to lash myself with it whenever I addressed her.)

" 'It was a period of most interesting integration,' she replied. 'In fact, it has been a precious experience. But I have come to realize that we were hasty in terminating the noble lives of my fellow men.'

"This was ominous! I made her go for a walk in the fields with me. Three times on the way out she found things I lightly mentioned to be problems requiring immediate squatting and meditating!

"I sensed that this was the crisis, and it was. I threw all my resources into an attempt to force immediate victory. I held her hands with one of mine, hooked my free arm around her waist, placed my lips to hers and crooned, 'Marry me right now, darling! I can't wait! I love you, I adore you, I am quite mad over you!'—and damn it, at the word mad she squatted!

"I picked her up and tried it again, but like clockwork, on the word mad she went down again. Oh, I was mad over her, all right!

"I was boiling! You see, I had to hurry so! She was changing right under my nose!

"I fairly flew back to the time machine. I was going to learn once and for all what my future with regard to a potential human race was to be. I set its dials one year ahead.

"This time I found Pearl in the vacant cell. She was distinctly older, dryer, thinner, and her head was larger in size. She sat on the dais as had the others; and there was a light dust on her clothing——

" 'It is strange that you should come at this moment,' she said in a rusty voice. 'I was thinking of you.'

"With the last word she closed her eyes—so she should not see me, only think of me. I saw that the food box was full. Despair in my heart, I went back to the traveler.

"For a long time I hesitated in front of it. I was close to the bottom. The change had happened so quickly! To Pearl it took a year, to me, only an hour; yet her acts were as fixed, her character as immutable, as if they had been petrified under the weight of a millennium.

"I nerved myself for what I had to do. Suddenly, recklessly, I jumped on the traveler, set it for seventy years ahead, and shot forth into time.

"I saw Pearl once more. I hardly recognized her in the monster who sat on the dais in her cell. Her body was shriveled. Her head had grown huge. Her nose had subsided. Her mouth was a nasty, crooked slit. She sat in thick dust; and there was an inch of it where there had once been brown hair, and more on every little upper surface.

"She had a musty smell!

"She had reverted to type. She had overcome the differentness of her start and was already far down the nauseating road which over-brained humanity has yet to go.

"As I stood looking at her, her eyelids trembled a little, and I felt she knew I was there. It was horrible; but worse was to come. The mouth, too, moved; it twisted; opened; and out of it came an awful creak.

" 'Tell me that you love me.'

"I fled back to my time!"

IX.

FRICK'S long narrative had come to a close, but its end effect was of such sudden horror that Miles and I could not move from the edges of our chairs. In the silence Frick's voice still seemed to go on, exuberant, laughing, bitter, flexing with changing moods. The man himself sat slumped back in his chair, head low, drained of energy.

We sat this way long minutes, each with his thoughts, and each one's thoughts fixing terribly on the thing we knew Frick was going to do and which we would not ask him not to do. Frick raised his head and spoke, and I quivered at the implication of his words.

"The last time she had food for only five years," he said.

Out of the depths of me came a voice, answering:

"It will be an act of mercy."

"For you," Frick said. "I shall do it because she is the loathsome last."

He got up; fixed us in turn with bitter eyes.

"You will come?" he asked.

We did not answer. He must have read our assent in our eyes. He smiled sardonically.

He went over to the door he had pointed out, unlocked it with a key from his pocket, pulled its heavy weight open, entered, switched on a light. I got up and followed, trembling, Miles after me.

"I had the traveler walled up," Frick said. "I have never used it since."

I saw the machine. It was as he had described it. It hung in nothingness two feet off the floor! For a moment I lacked the courage to step on, and Frick pushed me up roughly. He was beginning to show the excitement which was to gather such momentum.

Miles stepped up promptly, and then Frick himself was up, hands on the controls. "Don't move!" he cried—and then the room was dim goldenness, then nothing at all, and I felt permeated with fathomless silence.

Suddenly there was the goldenness again, and just as suddenly it left. We were in a small dark room. It was night.

I wondered if she knew we were coming.

We went to her silently, prowlers in infinity, our carpet the dust of ages. A turn, a door—and there was field land asleep under the pale wash of a gibbous moon. A walk, a turn—and there were the thirty-six sepulchers of the degenerate dead. One, not quite dead.

I was as in a dream.

Through the tall grass we struck, stealthily, Frick in the van like a swift-stalking animal. Straight through the wet grass he led us, though it clung to our legs as if to restrain us from our single purpose. Straight in among those silent sepulchers we went. Nature was nodding; her earth stretched out everywhere oblivious; and the ages to come, they did not care. Nor cared the mummied tenants of each tomb around us. Not now, with their heads resting on their ribs. Only Frick did, very much. He was a young humanity's agent before an old one's degradation. Splendidly, he was judge and executioner.

He slowed down before the sepulcher where was one who was yet alive. He paused there; and I prayed. An intake of breath, and he pulled open the door and entered. Dreadfully, Miles, then I, edged in after.

The door swung closed.

The tomb was a well of ink. Unseen dust rose to finger my throat. There was a musty smell! I held my breath, but my heart pounded on furiously. Ever so faintly through the pressing silence I heard the pounding of two others.

Could it be possible that a fourth heart was weakly beating there?

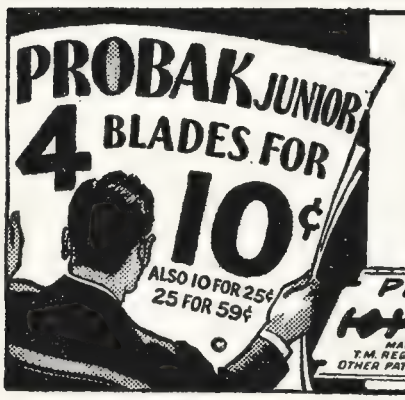
Faint sounds of movement came from my left. An arm brushed my side, groping. I heard a smothered gasp; I think it was from Miles. Soon I had to have air, and breathed, in catches. I waited, straining, my eyes toward where, ahead, there might have been a deeper blackness through the incessant gloom.

Silence. Was Frick gathering courage? I could *feel* him peering beside me there, afraid of what he had to see.

I knew a moment when the suspense became intolerable, and in that moment it was all over. There was a movement, a scratch, a match sputtered into light; for one eternal second I looked through a dim haze of dust on a mummied monstrosity whose eyelids moved!—and then darkness swept over us again, and there was a sharp crack, as of a broken stick, and I was running wildly with Death itself at my heels through that graveyard of a race to the building where lay our traveler.

In minutes we were back in our own time; in a few more Frick had blown up the traveler and I was out of the laboratory making for the Sound, sharp on my mind, as I went, the never-to-be-forgotten picture of Miles as he had raced behind me blurting, "She blinked! Oh, she blinked!" and that other, striding godlike in the rear, a little out of his head at the moment, who waved his arms over that fulfilled cemetery and thundered:

"Sic transit gloria mundi!"



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Murray's Light

by Donald Wandrei

THE SPARK that ignited strange fires in countless homes was furnished by Colton Cooke. Any one else might have obtained the interview, but it so happened that Colton Cooke was the first reporter who heard about it. The thing had apparently been going on for a little while even before it came to his attention.

It was far from being a matter of chance, however. The Leawiths invited him in for dinner one evening. They were old friends of his and followed their customary ceremony of

serving cocktails in the living room before dinner.

Both Roy and Edith had an air about them, a very definite air, like that of the cat who licked all the cream, or of practical jokers about to spring a surprise.

"What's the matter with you two?" Cooke demanded. "You're acting like a couple of amateur sleuths. Don't tell me this is somebody's birthday or anniversary or something."

"Who? Us? Why, no!" they chorused. Roy added, "Bring your cocktail with you and we'll start."

Cooke finished it in a gulp and deftly took Edith's arm, allowing Roy to trot behind them.

It was a neatly set table in the dining room. Everything was neat and orderly and quietly tasteful. But something was wrong. Colton paused inside the doorway. He felt that both Edith and Roy were waiting for him to speak a word or make some special action. He glanced around the room again. Not one of the wall lights was burning. He looked back at the table. Then he caught the reason for the air of mystery.

There was a light in the middle of the table. It was not a candle, nor an electric light, nor a gas lamp, nor a lantern. From a distance, at least, it did not seem like any form of illumination with which he was familiar.

"What the deuce is that?" Cooke asked as he walked over to the table to study the object at close hand.

A curious item it proved to be. A pear-shaped glass bulb, somewhat like the familiar electric light bulb, had its narrow end embedded in a wooden base. Two flanges of gleaming metal curved with the glass and almost met at the top. Light poured from the globe—soft, steady, strong light that filled the room with an even and restful illumination, save where the flanges became panellike shadows on opposite walls of the room.

A milky, radiant mist filled the globe. It contained no wires, filaments, electrodes, or contrivances of any sort. Nothing but that bright mist. It suggested the light that emitted from neon, argon, and other rare gases used for illumination, but such light pulsed and flickered, while this light remained motionless. And cold. The glass was as cool to the touch as fresh water.

Colton suspected a trick. He lifted the object. It came away free. There were no hidden wires in the base, no power connection in the table. Light continued to shine from the bulb. The transparent glass remained as cool to the touch as night air.

The reporter whirled around. "What is this—Aladdin's Magic Lamp?"

Roy answered with a grin, "I thought it would get you. It's an Arctolight. They've just been put on the market."

"A what? Spell it."

Roy obliged. Colton continued, "Where did you get it?"

"From the chap who makes them. Fellow by the name of Murray—D. V. Murray. You can't buy them at stores. He's a funny sort of duck. Sells direct; won't fill quantity orders, and won't sell to dealers."

"What did this one cost you?"

"Three dollars. It's guaranteed for six months."

Colton whistled. "Only three dollars? What's Murray's address?"

He jotted the answer down and bolted from the room.

"Wait a minute——" Roy began to protest.

Cooke retorted, "Wait till somebody else grabs off a swell story and a million-dollar scoop? Not on your life. I hate to run out on you, but you and Edith go ahead without me and I'll drop in after I've got the yarn. It's your own fault for putting me onto it!"

With that he was gone.

A taxi whirled him to the given address a good half hour later. Cooke got out in front of a dilapidated old three-story building near the Hudson River on the lower west tip of Manhattan. It was a factory and warehouse district, adjutting a slum area. Most of the buildings were dark. He did not see a single passer-by. The spires of Wall Street and the financial district rose not far away.

Here was quiet and desertion. But light shone from the edges and sills of every curtained window in the particular edifice in front of which he stood. The structure had show windows—empty—on the first floor, and apartment windows above. Evidently it was one of those hybrid buildings common to the area.

Cooke walked into a small lobby. Two doors made a right angle. He knew without further investigation that the left door led to a flight of stairs. The name-slot underneath the bell button had a card: "D. V. Murray." The door to his right bore the gild-lettered words: "Arctolight Supply Company, President, D. V. Murray." From within came sounds of activity.

The reporter tried the door but it was locked. He pounded insistently. After perhaps a half minute's wait, he heard the sound of heavy footsteps, then the scrape of a bolt being drawn. The door jerked partway open.

AN IMMENSE MAN blocked the opening. He had stiff, black hair and a beard of flaming red. His eyes glowered suspiciously. Great strength and determination were stamped on his rugged features. His gnarled hands, bunched into ominous fists, hung from long arms and powerful shoulders.

"Well? What do you want? Don't stand there like an idiot!" The apparition roared. It may have meant to speak, but its voice boomed. Cooke wondered what sort of thunder would emerge if its owner became really angry.

"I want to see Mr. Murray."

The giant retorted, "Now that your wish has been granted, get out."

Into the slamming door, Cooke protested, "I'm a reporter. I'm worth a million dollars to you. Take it or leave it. No strings, no conditions, no buy, no sell, no nothing."

"I don't want any damn reporters nosing around. You can——"

The news hound shouted, "Snap out of it! Haven't you even got half a brain? I'm here to do you a favor. I'm not prying into your affairs. I don't give a hoot who you are or what you've done, except in terms of public interest. You've discovered something that's worth a front-page feature and millions of dollars worth of free publicity to you if it's what I think it is. The public will lap it up. They'll flood you with orders. You'll get sales and advertising overnight that you couldn't buy no matter how much you offered. Now what about it?"

Murray stared at him, more in surprise than anger. Evidently he was not used to such rough reception as he dealt others. He flung the door open and yanked Cooke inside. "If it's a gag, I'll beat you to a pulp. I can do it."

Cooke snapped, "Save yourself the trouble." He stood in an office, illuminated by several of the queer bulbs. A desk occupied one corner beside a filing case and a small safe. The rest of the room was piled high with wrapped packages.

"Sit down," Murray commanded, brusquely.

There being no place to sit, Cooke remained standing. "I just saw an Arctolight at a friend's home. I want to know more about it."

"The only person in the world who knows all about it is me, and I'm not telling."

"You don't have to tell all," Cooke answered. "I simply want a general idea which I'll dress up in my own language. The public is mainly interested in the fact and its value, not the details. It probably couldn't understand the details anyway. Like the Einstein theories, you know."

Murray hauled out a pair of evil-looking stogies. "Have one?" Cooke lighted it and went through torture for the service of his profession.

"You've discovered the principle of cold light?"

"Yes. That and other things."

"How long have the magic lamps been on the market?"

"Less than a week. We've been manufacturing for a month. We accumulated a stock before we told friends."

"Who are 'we'?"

"My sister, three trusted relatives and myself."

"You mean that the five of you are the whole works? You make and package and sell the units here? A family business?"

"Yes. We're the whole company."

"My friend Leawith said he paid three bucks for his Arctolight. How much does it cost to manufacture them?"

Murray hesitated but finally admitted, "It costs just over fifty cents per unit. We buy the bulbs, bases, and horseshoe bars in lots of ten thousand. What I put in them is my secret."

"How many per day can you turn out?"

"Right now, we average five hundred. I may take a few more relatives in later and get the output up to five or ten thousand."

Colton Cooke whistled. "Holy Jumping Jerusalem! $1,250 per day clear profit now! $25,000 per day if you turn out ten thousand of them! Whee-ew! How about letting me put a little money in the business?"

The giant laughed. "There won't be that much profit. I'm putting nine tenths of the money back into the business for supplies, reserves, and expansion. Besides, I'll keep lowering the price as we accumulate funds. The high price now is merely to give us an ample working margin.

"You see, it's this way. I've been struggling with this idea all my life. Cold light. I started out as an electrical engineer. I worked for several of the big electric companies and I hate them all. They rooked me out of several discoveries I made, just as they rooked the public. I quit after I saved up a little money. I went ahead on my own until I found what I was looking for. Cold light. Inexhaustible light. A new principle that has nothing to do with electric power.

"See what I'm driving at? I've discovered something that every one who owns a house or apartment will want. No more electric bills, no paying high monthly charges to the utility companies. One Arctolight will last six months, perhaps indefinitely. They're foolproof. And when I get the cost down to a dollar or less, they ought to sell by the million!"

"You own all the patent rights?"

"There aren't any."

The answer startled Cooke. "Didn't you patent the invention? Why not?"

The engineer explained. "Because the big utility monopolies, with all their wealth and influence, could have challenged the patent application, or infringed the patent and flooded the market. I didn't have the money to fight a long court battle. Even if I did and won, years later, the utilities would still have the market cornered, and their own scientists by then could have worked out a variation of the principle. They might move heaven and earth first

of all to buy the patent rights, but I wouldn't and won't sell under any conditions."

Cooke shook his head. "You're taking a big risk just to carry out a grudge against big business. Man, you'll be big business in person before a year passes! Give me some sort of idea that I can use as a convincing basis for the feature. This principle——"

Murray hedged. "I won't spill the secret, but you might use something of this sort. Say that I've discovered a way of sensitizing one of the rare gases so that cosmic rays, which are always present around us, strike the gas and produce light without heat. After six months or a year, the gas atoms wear out and the light grows feeble. Will that serve the purpose?"

"It will have to. You're sure you haven't accomplished the wireless transmission of power?"

Murray smiled. The reporter jotted down a few more notes and hurried out.

COLTON COOKE was even better than his word. The nature of Murray's invention fired his imagination. He visualized Arctolights flooding the country, an essential in every home, the basis of a major new industry. He called them magic lamps, a phrase that stuck. He foresaw vast upheavals among the public utilities. He got statements of guarded interest from several scientists and cagy refusals to comment from various power company officials.

His story, sent out by one of the international news agencies, made the front page of most of the country's leading newspapers. It gave the initial impetus to Murray's business. It started a storm of debate among scientists, who were confronted by the reality of Arctolights but given no tangible clue to work on by the reticent Murray. There was an uproar among lighting and power companies. They made fabulous overtures to Murray, while their own scientists were busy in their own laboratories studying and analyzing these odd new bulbs.

Then began a strange game, a game that was partly a struggle for power by big business, and partly a scientific sleuthing. The purpose of both was to duplicate Murray's invention.

The companies tried to buy Murray's entire output in an effort to keep them off the market or to resell them at their own price. Murray refused to sell to middlemen, and prorated orders with a limit of two Arctolights per customer.

There was wild confusion in the stock markets. Shares of leading light and power companies slid off five and ten points at a transaction. Huge equities were wiped out overnight. Frantic traders and business men, in the first alarm following Cooke's feature story, forgot that Murray's lamp could supply illumination but not heat or power. Electric current would still be required for running the machinery of industry.

Stocks rallied, but well below their previous levels. If Murray had wanted to finance his company, he could have had millions for the asking, but the dark-haired, red-bearded giant was determined to fight his battle single-handed.

True to his promise, he kept lowering the price of Arctolights as output increased and as working capital and reserves reached safe large margins. He steadied at ten thousand lamps per day, and stabilized the retail price at a dollar per lamp. Later on, he promised to manufacture Arctolights in different sizes, but for the present he clung to the one size.

The utilities slashed light and power rates lower than they had been within living memory, but still the orders flooded into Murray's offices. He did not need to spend a dime on advertising. The novelty of his discovery impressed every purchaser. Even without the

benefit of Cooke's glowing feature article, word-of-mouth publicity would have put the invention across. The strange spectacle of steady illumination pouring from a mist-filled bulb which remained at room temperature, fascinated the public.

In addition, the magic lamps had certain convenient features. They could be moved around freely. They could be carried outdoors by night and served the place of flashlights. They cost nothing for upkeep or maintenance. So far as known, they were not dangerous and could not cause injuries. When broken, the vaporous content instantly dissipated.

Arctolights had made their appearance late in April. Early in May, a bribe was offered to one of Murray's staff. This initial attempt was succeeded by many others, and the bribes reached impressive figures. They were all rejected, for the excellent reason that only Murray knew what actually went into the bulbs.

Two attempts were made on his life. Murray caught the first would-be killer before much damage had been done and sent him to a prison hospital for three months. The second attack was more circumspect and seriously injured him with a bullet in the chest. Thereafter, he kept a bodyguard. He allowed no one, however, to enter his special workshop where he filled and sealed the Arctolights. His determination to keep that wonderful secret locked within his own head amounted to an obsession.

Cooke looked him up after the second attack. He went to the hospital where Murray was reported to have been taken and found to his amazement that the giant had been discharged on his own insistence the same night that he had been treated.

The reporter found him resting in his apartment above the workshops. The engineer's vitality was extraordinary. "It will take more than one measly bullet to stop me," he boomed. "Do I know who attacked me? Sure, but I'm not telling. I can't be bothered. They'll never get another chance and half the battle's won already. Arctolights will be manufactured again within two days."

They were.

MAY waned into June and hot, sticky days began to make their appearance in New York City. The novelty of Arctolights had scarcely diminished. Thousands of apartments were lighted by their peculiar, soft irradiation. True, they had one basic disadvantage that Murray had not thought of, but which he speedily remedied. They furnished light that was not only constant, but too constant. They could not be turned off readily. Early purchasers solved the problem by various subterfuges such as putting the magic lamps in dark closets when the owners wanted to sleep. After the first few thousands, Murray distributed a black pasteboard cover with each bulb.

As June flowered into July, the powerful utility and financial interests won their initial victories. They forced "joker" laws through the legislatures of three States. The new laws required an accurate description of all electric, lighting, power, gas, and steam equipment and appliances to be filed with State power commissions. Murray fought for temporary restraining injunctions and won. He battled for permanent injunctions and lost. He fought the cases toward the supreme court but they never reached that austere body.

July sizzled into August, and Arctolights flowed in endless procession to all parts of the country. Controversy still raged in Sunday supplements, feature pages, trade journals, and scientific periodicals. Murray's failure to protect his discovery or invention brought frequent comment. Numerous experi-

menters sought the elusive secret, knowing full well that under the patent laws, Murray might be deprived of all rights and rewards if some one else filed an application before he did.

As August baked toward the cooler breezes of September, the war department suddenly became active. Under the patent laws, any invention that affected national defense could be taken over by the government. An order was issued for the confiscation of every Arctolight, while the postal officials and express agencies received instructions to segregate every parcel sent out by the Arctolight Trading Co.

FOR ONE WEEK, the order held. Murray issued a biting, blistering statement through the press. A howl of angry protest went up from the owners of Arctolights and from the public. There was a departmental investigation which hushed up an incipient scandal. Officials blandly explained that an overzealous minor clerk had issued the offending order. The "minor clerk" had received a sum in six figures from one of the nation's big electric lighting companies, but that interesting fact did not come out until long after.

September blew and blustered toward October, in between spells of deceptive Indian summer. The influential power interests had uncovered a number of significant facts by placing detectives on Murray's trail, investigating his previous life, and exposing every phase of his existence to a searching inquiry.

They learned that Murray had spent a year above the Arctic Circle, from which trip he had returned less than six months before his magic lamps appeared. He had taken along with him considerable equipment of an electrical, physical, or optical nature. His trip coincided with the maximum period of the sunspot cycle.

They found that Murray had been pursuing exhaustive researches into the mysterious field of cosmic radiations. They discovered that he ordered his bulbs from the Shatter-Pruf Glass Co., the wooden bases from another concern, the horseshoe magnets from still another, and that a chemical firm was selling him large amounts of krypton and argon.

Scientists of the utilities made progress in analyzing Arctolights. The magic lamps were not a vacuum type; or at least, if Murray did create a vacuum within them, he did so only to replace oxygen with a mixture of krypton and argon. His formula was not, however, chemically identifiable. That is to say, its spectrum showed nothing unusual, but the compound did not possess the precise atomic weight permissible by any conceivable proportion of krypton and argon. Since no other element could be proved present, the inference was that Murray was treating these rare gases by some process that turned them into isotropes, heavy argon and heavy krypton.

When placed under protective lead sheathing, the lamps continued to emit light, but highly sensitive photo-electric cells demonstrated that the light value was diminishing at a constant if micro-millimetric rate. The results indicated that after two or three months the bulbs would cease to emit light.

The physicists carrying out the scientific sleuthing of the big utilities puzzled over this phenomenon for some time before anything like a tenable theory was advanced. The manifestations seemed contradictory. They appeared to show that the bulbs had a vital connection with cosmic radiation; and also that such radiation was not essential to their operation.

The analysts reached an astounding conclusion, the only conclusion that interpreted the facts. Arctolights not only utilized cosmic radiation and turned

invisible energy into radiant energy. They also served as storage batteries, accumulating excess energy which continued to be released as light even after they were cut off from the original source of energy. This hypothesis forced the further conclusion that Murray was literally packing the vast intra-atomic interstices with energy in an abnormal captive state.

The investigators removed the metal flanges outside the bulb to see what might happen. It happened. The bulbs instantly went dead, became mere glass shells inclosing fog. But there were attendant phenomena.

Pecision instruments recorded the fact that invisible energy was still being released. And the bulbs began to grow warm. In two hours, the glass was hot and glowed red. It swiftly reached fluidity and melted, with a collapse of the bulb and release of the gases.

This sequence encouraged further speculation. Success of Arctolights depended on the magnetic field set up by the external magnet, a field that existed within the bulb. Removal of the magnet removed the field; then the stored-up energy passed from an unstable state of captivity to another unstable state of rapid dissipation in the form of heat.

The scientific hunters now had all parts of the puzzle except the key—what Murray did to argon and krypton to give them these strange properties. As the reconstruction stood, he modified the natural state of two elements into a combined unnatural state. He tapped cosmic radiation, probably of an electromagnetic nature, and stored it within the vast spaces between the infinitesimal components of atoms. The leakage seeped out as cold light. He created storage batteries of an inconceivably submicroscopic scale. And he set up a simple magnetic field that interacted with an unidentified cosmic or hypermagnetic field.

At this stage, a firm of lawyers who declined to name their retainers approached Murray with an impressive proposition. If he would divulge his secret and surrender all claims and rights, he would receive the largest check in history.

Murray laughed. "Let them go ahead and make the same discovery," he taunted the agents. "I have no patent. If they succeed, well, I'll meet that problem when it comes. I've fought the power combine single-handed and made them come down off their high horse. That's worth more to me than the biggest check they could write by pooling all their resources. The public is with me and I'm with the public. The utilities be damned."

DAY AFTER DAY, the same number of Arctolights were shipped. The demand and orders far outstripped the supply. By the middle of October, Murray was two months behind on delivery, his small staff utterly unable to cope with the orders. At the end of October, dozens of physicists were still attempting to solve the secret of Arctolights. It is possible and probable that they would have succeeded in course of time if another circumstance had not intervened and ended the quest.

Throughout the month of October, there had been frequent displays of the Aurora Borealis. Murray became taciturn, moody, and increasingly brusque with his aids. He spent a good many hours staring at the night sky.

The month waned, and October 29th found him working late at night with other members of his staff. October 29th also saw an unparalleled display of Northern Lights. October 29th furthermore marked the end of a great enterprise conceived in ambitious dreams and concluded in wonder.

When dusk fell, Canadians witnessed the coruscating shift and play of the

Aurora Borealis far to the north. Hour by hour, the flaming bands and streamers swept southward. The sky glowed with enigmatic fires. Infinity clad itself in eerie raiment. Fluctuant colors rioted with cold, inexorable abandon. The sheeted tongues and falling curtains rippled farther. Cascades of marvelous hue radiated from the magnetic pole. The frosty fountains spilled out of the north and tumbled in dazzling variety southward. Before midnight, the vast, cosmic parade had reached proportions never before known. The whole of Continental North America was domed by a torrent of incredible flame; and far out to sea above the adjacent waters swept that apocalyptic deluge of ghostly and transitory glory.

From window and rooftop, from hill and street, watchers across the land viewed the mighty display. In silence and awe they witnessed the oblivion of stars and the many-colored ecstasy of illimitable space. It was almost as if a strange new life had come into being in alien beauty. The Northern Lights swelled and streamed and pulsed into an intolerable splendor like a symphony of gods. Lambent waterfalls sloped and plunged from colossal regions to ever-changing rivers of deepest violet to darkest red. The purple majesty of night succumbed to the surge of color staves projected against infinity upon the immeasurable cadences of the star-obliterated skies. This was the holocaust, this was Armageddon, wherein were rapture and awe in the hearts of those illuminated by a stupendous rampage of celestial forces.

From the burning heavens came messengers who sought their own. Destiny donned impalpable fingers. Phantasmal ribbons fluttered from oceans of light that raged mysterious. The sky crept down to earth in countless questing festoons. The air was stilled with the weird beauty of shadowy forms that drifted everywhere. Shapes of cold fire rippled and swirled along the ground.

Murray looked up and shielded his eyes as phosphorescent splendors burst into his workshop. There were little explosions. The mist in the Arctolights danced with sudden eagerness. Rainbow hues flickered in blinding abandon where previously had been only soft white light. The burst of bulbs ticked off the freedom of captive energies. Fires sprang up where molten glass dribbled on combustible substances. The fires were pale in the presence of those departing incandescences.

When the gray dawn arrived, the magic lamps were only a memory, as intangible as the unearthly radiance that had taken their secret back beyond the Arctic Circle.

The Plane Compass

In which a man plots carefully to lose another in a strange darkness and abandon him to the mercy of fate

by Harl Vincent

WHATEVER else he might be, Hannishaw was no fool. He knew that he was slipping, and realized that the time had come when he must do something about it. That is if he was to retain his envied position and obtain the thing he had come to want most in life.

Amalgamated Electric continued in its costly indirect advertising to ballyhoo him as the greatest scientist of all time, as the star whose light dimmed to insignificance all the Newtons, Edisons, and Einsteins of past generations. For nearly two decades they had been building up this reputation of his, using radio interviews, syndicated newspaper features, and high-class magazine articles which cleverly avoided the appearance of publicity matter.

To the public he was the "Master of Science," outstanding in genius, eecentric in habits, scornful of personal fortune and of love, interested only in the benefit to mankind of his own marvelous discoveries. All of which Hannishaw knew was untrue.

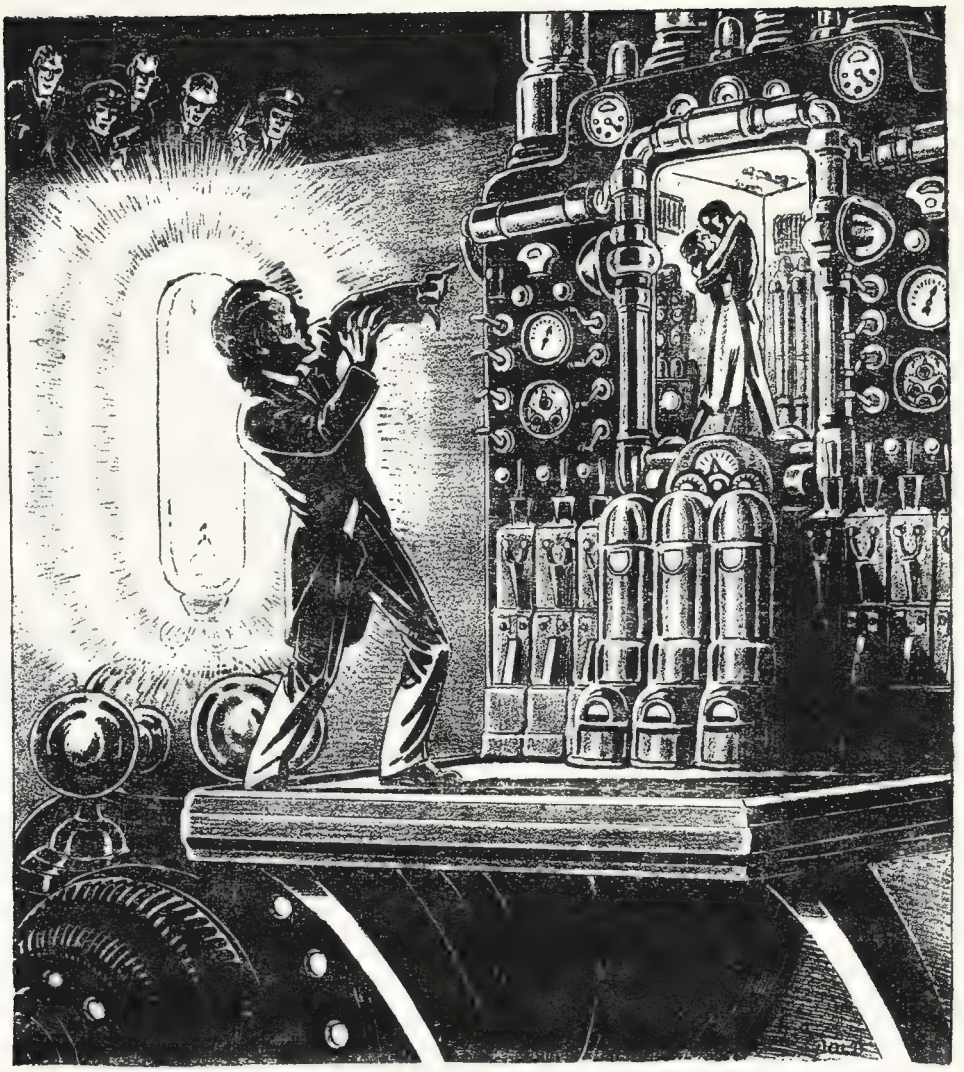
He posed for photographers, waved his long-haired wig before the scanning apparatus of the television news casts, spouted bombastically into microphones, and gloried in the publicity that accrued to himself. But in his heart he knew all of this for the commercial scheme it represented, and he knew himself for the fraud he was.

Hannishaw was not entirely without ability as a scientist, but was too lazy and self-centered ever to be a genius. The discoveries and scientific marvels credited to him by his canny employers actually had been the work of numbers of his subordinates in the huge laboratory on Oak Hill.

No one man, however great a genius, could possibly accomplish in a lifetime what Hannishaw was supposed to have done in a few short years. But to create the mythical figure of such a superman and master of science was good business for a great corporation like Amalgamated. It put them in a class by themselves and strengthened the world-wide belief that they were supreme in the manufacture of technical and electrical apparatus of all kinds. It had made them just that, and so they kept on fostering the illusion that was Hannishaw.

Nevertheless, he was losing his grip. He knew it, and certain of Amalgamated's directors knew it. Something would have to be done to reëstablish the prestige that was slowly but surely waning. A great and momentous new discovery must be announced from the laboratory on Oak Hill within the fortnight. To-day Hannishaw had been so warned by the chairman of the board.

For the first time in years he went, at night, to his office in the laboratory building, although it had been firmly implanted in the public mind that he ate and slept in the place, if indeed such



And that is the way they were found when the cubicle was returned. Hannishaw was beaten!

commonplaces were necessary at all to so great a man. Now he had a definite motive for being there after hours, one that had to do with papers he suspected were in the desk of his most attractive Titian-haired secretary.

When he sat in Cora Deane's chair he almost forgot the reason for his coming. The faint perfume left by her personal belongings affected him so headily when he opened the first drawer that he hunched there for a minute motionless, his pale eyes staring dreamily into space. He, the "Master of Science," scornful of love?

Hannishaw grimaced when he thought of the fiction they had built around him, the fiction he had almost believed himself until the coming of the Deane girl. Now she was the ob-

ject of his greatest desire, aloof and unattainable seemingly, but—well, time would tell. Already a scheme was beginning to take shape in Hannishaw's covetous mind. He went on with his search.

THE PAPERS were there, in the second drawer he opened. Many pages of Miss Deane's painstakingly neat typewritten copy, stapled in a paper folder which was labeled with only a name and the date. The name brought a growl from Hannishaw's throat, but this was immediately succeeded by a series of gloating chuckles as he skimmed swiftly over the first few pages of manuscript.

His growl was occasioned by the knowledge that Cora Deane was interested in this young whippersnapper Sherwood, whose name adorned the manuscript cover, his chuckles by the revelations of the typed pages. This was just what he wanted. Of course, he had known in a vague way that Sherwood was working on this experiment. By right of his superior position, he could have demanded a report on it whenever he wanted it. But Hannishaw did not work that way. He gave a man all the rope he needed, let him bring an important work almost to the point of successful conclusion, then, by some underhanded method such as this, anticipated the fruition of the subordinate's labors, thereby managing to make it appear that the final credit was his own.

But this thing of Sherwood's was stupendous. Hannishaw's eyes narrowed to slits as he read on and on long into the night, and when he had finished the reading, they gleamed with excitement such as he had not known in his life. It was better than he could have hoped in the fondest of imaginings; the thing not only would startle layman and scientist alike, it would completely upset all previously conceived theories of the constitution of matter and the universe itself. It would—— Hannishaw's thoughts strayed away from scientific matters and became selfish.

He visioned Cora Deane's tawny loveliness and was shaken by the emotions that swept through him. She had not entirely frowned upon his suit, but had held him off, he believed, because of the importunities of the younger Sherwood. If Sherwood, now, were only out of the way, he was sure that his own exalted position and his money would outweigh any other considerations she might have. He, the "Master of Science," scornful of personal fortune? It was to laugh.

The Deane girl, as his confidential secretary, had full knowledge of the princely sum in cash and securities which was deposited monthly to his account by Amalgamated while they told the public he would accept only enough for his meager necessities. Being a woman, and, therefore, aware of the luxury and position in society he could give her, she would be certain to listen to reason. Perhaps she might do so even if young Sherwood were not out of the way, if Hannishaw pressed the point strongly enough. But it would be better and surer to remove him as a possible rival.

The scientist's tongue clucked loudly against his palate, almost frightening him by the way it resounded in the big room. He knew that he now had in his power a means of getting rid of Sherwood with entire safety to himself. At the same time he could clinch fast his position with Amalgamated and secure world prestige for himself which would far outshine anything that had gone before. He'd be killing two birds with the one stone.

Hannishaw darted from his office into the vast dimly lighted canyon that was the main aisle of the laboratory. The watchman was not in sight, evidently being at the far end of the great

building in the course of his nightly rounds. Unobserved, the science master of Oak Hill slipped into Section K, where Sherwood's apparatus had been set up.

He would be fully armed with knowledge before morning came.

CORA DEANE faced young Sherwood accusingly a week later in her own tiny Shadyside apartment. It was evening—long after regular working hours—and a dozen commuting miles lay between them and the great Amalgamated laboratory which overlooked the factories in the Turtle Creek valley. They could speak freely.

"Bill," she asked, "have you told Hannishaw all about it?"

The young research engineer replied dismally: "It wasn't necessary, Corrie. He seemed to know everything. At least he knew all that he needed to know—said he'd been working on the same thing for years, on the mathematics anyway. He had it all down pat, and besides made some constructive suggestions."

"Pooh! You mean he put through the appropriation and started work on a full-size machine like your scale model. I still think he stole the idea from you."

"But how?" Something caught at Bill Sherwood's throat as the girl's head moved into the circle of light from the table lamp. Her hair was a copper-gold halo. He had hoped that this research would bring him recognition and an increased salary so they could marry.

Cora Deane's eyes widened with comprehension. She remembered the night she had left a copy of the thesis in her desk. Hannishaw must have seen it then. She told Sherwood.

"Can't help it now," he shrugged. "And even if he did steal the idea there's no proof. What good is our word against his?"

The girl said no more. She knew some things that Bill did not know—yet. It was dangerous knowledge under present conditions; much as she disliked keeping anything secret from Bill, she would have to wait her time to use it. Looking at the clock, she said: "It's almost time for his speech."

Sherwood switched on the television radio. "A world-wide hook-up, Corrie. Think of the millions who'll hear and see the master—and believe."

"It isn't fair." The girl curled up on the arm of his chair, dabbing at her eyes with a handkerchief not much bigger than a postage stamp. Awkwardly, Sherwood cradled the golden head on his shoulder.

Hannishaw's image and voice came on the air at the scheduled time. Cora sniffed and sat stiffly erect when he tossed the long hair back from his face. She knew it was not his own. Other things, too, she knew. She always bridled somehow when he put on one of these acts; now she was more resentful than ever before.

"Friends of the radio audience," the master was saying. "I come before you to-night to upset long-accepted theories of science. All of you have been witnesses to the remarkable strides of science during the past few years; many of you have, perhaps, thought that the ultimate in knowledge and advancement had been reached.

"But I tell you to-night that only the surface has been scratched. In less than five years we shall have finished with the twentieth century and entered the twenty-first century. We shall enter it with a completely altered conception of the constitution of matter and of the universe in which we live; in fact, we shall begin this very day to alter our ideas along these lines. I shall try to put this first discussion of what I shall call the superuniverse in understandable language, but first I want all of you to put aside definitely all notions of time and space and matter as set forth in the

older theories of such worthy savants as Einstein and Eddington."

"Of course *they* didn't know anything," sniffed Cora Deane as the master paused for effect and smiled in a superior manner from the vision disk.

The radio voice rattled on: "In our new ideas of a superuniverse, we must begin with the premise that the forms which matter takes depend on human perception. Creatures of a differently constituted universe would be certain to have different perceptions and be unable to conceive of matter in the forms with which we are familiar; conversely we could have no conception of matter as known to them.

"My worthy predecessors have instilled in us the idea that the true universe is a continuum of four dimensions, finite though unbounded because curved, an expanding universe, perhaps, but yet finite. I maintain, and have proved in the laboratory, that this seeming finity of the universe is indicated only by the limits of normal human perceptions, that the true or superuniverse is infinite, multidimensioned, and comprises an infinite number of what I shall refer to as planes.

"These are planes of perception, and existence in the multitude of other planes is of form imperceptible and inconceivable to ordinary mortals of our own plane. In the fifth and higher dimensions there are differing oscillation intervals, as there are varying configurations in the curvature and warping of space time in the universe of four dimensions we are accustomed to call our own.

"The elements of matter as we perceive it in our own limited universe, or more properly in our own plane of existence, are ninety-two in number. There can be no more elements in our own plane of perception; neither are these same elements existent in other planes, where matter is constituted along entirely different lines and in infinite variety. The only phenomenon which is common to all planes of the many-dimensional, all-encompassing, or true universe, is the phenomenon of light. And it is in this regard that my predecessors have most seriously erred.

"They have assigned a finite velocity of light; some have seemingly proved this to be the limiting or unsurpassable velocity for any moving matter, and have propounded theories to suit, such as the old Lorenz-Fitzgerald transformation.

"As a matter of fact, the velocity of light is not finite but infinite, and therefore cannot be assigned any such value as the generally accepted figure of approximately one hundred and eighty-six thousand miles a second. Actually this value would better be termed the critical velocity or the velocity of human perception in a universe perceived as finite. Its determinations as the speed of light have been entirely fictitious, the apparently finite velocity being produced by distortions in our own space time continuum in the neighborhood of the solar system. In outer space, even in our own universe, where there is a minimum of distortion of this sort, the transmission of light has been observed as practically instantaneous.

"This is evidenced by the fact that the so-called velocity of light remains identical whether an observer is traveling toward or away from the source of light and regardless of the speed at which he travels. It is further proved by reference to observational data on the recent nova which was born in the constellation Ophiuchus. Astronomers have told us that the dark nebula in Ophiuchus is sixty light years long and five light years wide. But the new star lighted this immense area instantly when it appeared; its light did not require as much as sixty seconds to traverse the length of the nebula, let alone sixty years.

"You understand that all perception is relative—that much of my predecessors' theories I concede. But they failed to relate perception to a superuniverse where the velocity of light is infinite and where there are multitudinous planes of existence, in each of which planes matter is moving at a definite harmonic or even multiple of the critical velocity of perception. It is, one might say, like a succession of octaves such as are encountered in the vibrations corresponding to musical tones or in the electromagnetic spectrum. For each octave a new plane of existence and of perception."

THE "Master of Science" paused once more for the effect this invariably had on his listeners.

Cora Deane spoke in a voice that was like splintering glass. "A parrot, that's what he is. Your words exactly, Bill."

Hannishaw went on in hushed, mysterious accents: "Friends, I have seen into numbers of these planes, using a new instrument that functions at multiples of our critical velocity of perception. There is plant and animal life in some of the planes, intelligent animal life, even. Humanlike creatures, living in unimaginably different environments. An apparatus I now have under construction will enable us to visit these other planes of the superuniverse. In a very few days I shall use the apparatus. An assistant is to accompany this——"

Galvanized into sudden activity, Sherwood had snapped off the television radio.

"Bill!" the girl objected. "There is more, much more. I wanted to hear."

"It's the same old stuff you typed for me, Corrie. Just the old proofs that there's no limiting velocity for moving matter—and—and—all that sort of thing."

Cora slipped from the arm of the chair and stood waggling a pink finger tip just under Sherwood's nose. "You're holding out on me," she accused. "Bill, I just know you're planning to go traveling in these horrible p-planes, or whatever they are. And I won't have it. It's dangerous."

She was sorry as soon as she had spoken. Bill had no alternative if Hannishaw wanted it that way, she knew. If he refused to do as his chief ordered he would lose his job, and jobs were mighty hard to find these days. Besides, she had a couple of cards up her sleeve that she might be able to play before this was over.

Sherwood's rather sheepish grin was admission enough that she had guessed correctly as to the plans. All he said was: "It isn't at all dangerous; I've explained that. And what else could I do?"

"Anyway," the girl capitulated, "you said you'd take me to see the apparatus and tell me more about it. Make it tomorrow night; I'll vamp the watchman into letting us in. Promise."

He promised, and that was how they let the matter stand.

HANNISHAW'S speech went over in a big way. It set the world of science by the ears and startled the general public out of its usual aplomb. The academies of science and the engineering societies both here and abroad seethed with congratulatory and denunciatory argument. The science master was the recipient of seven new honorary degrees in the space of twenty-four hours. To the man on the street, "Hannishaw's Theory" became a byword, although it is doubtful if one person in every million was able to comprehend it. In any event the results in the way of valuable publicity were all that could be desired.

Ordinarily, Hannishaw would have been content to bask in the limelight, doing nothing but attend the round of

banquets and receptions always arranged in his honor on similar if lesser occasions. But this time the thing was too big; he had too many irons in the fire, too much at stake, to risk leaving what he was doing. The executives of Amalgamated, overjoyed and amazed at his sudden success and fresh accession of energy, canceled all engagements for his public appearance and agreed to let him work alone and unhindered in the laboratory. They put through, without question, all his requisitions on the great factories in the valley below for expensive material and overtime work on the apparatus he needed. So far, everything was plain sailing.

Although admittedly no genius at all, Hannishaw had the faculty of deceiving almost everybody into belief in his greatness. His memory was excellent, and he had a fair understanding of the fundamentals of science, besides having in his younger days become almost expert in the design of alternating current electrical machinery.

Expert, that is, in making working drawings of such apparatus from the calculations of one of Amalgamated's corps of mathematicians. The point is, he did have an idea of polyphase currents, wave forms, power factor, synchronization, and the like. It is, therefore, not surprising that his own understanding of the "Hannishaw Theory" was somewhat different from that of young Sherwood, its originator. Nevertheless, it was understanding, and in the main not far from correct.

The mathematics of the theory, of course, were far too deep for the master to grasp. The high points, and the possibilities, however, did not escape him. Perhaps he even thought of possibilities that had not occurred and would not occur to Bill Sherwood. He accepted young Sherwood's proofs of the infinitude of light's velocity. This seemed simple enough and easy to believe; no one had ever seen light traversing empty space; one could observe its source and the illumination of the body it strikes, but never its passage unless it might be through a dust-filled atmosphere, a gas, or a liquid. It was reasonable to suppose that its actual passage was *between* the planes of perception and at an infinite velocity. It was likewise easy to believe in the formerly supposed finite velocity of light as actually a limit of perception, and to conceive of Sherwood's "planes" as harmonics of this critical speed.

Hannishaw envisioned the superuniverse which he had adopted as his own to resemble the sine wave of a single-phase alternating current. There were an infinite number of peaks and valleys of equal spacing and magnitude, the spacing being equivalent to one critical velocity, the peaks corresponding to the infinite number of planes of perception or existence.

He thought of a material body which was to pass from one plane of the superuniverse to another as propelled in a similar sine wave of superspatial motion which was then synchronized with the wave of superspace itself. It was like the paralleling or synchronization of one alternating-current generator with another, or like the "phasing in" of a synchronous motor with the source of alternating current supply. If either apparatus was "out of step" with the other it could not operate on the same power line. Sometimes, even, serious wrecks of large power-plant machinery had resulted from the attempt to parallel a huge generator only a few degrees out of phase with those already operating and feeding the same main busses or superpower transmission line.

It was this last which had given him his idea. He had no thought of accompanying young Sherwood on the first trip to other planes of the superuniverse. Sherwood would be the first voyager—alone—and the "Master of Science" would contrive to send him into super-

space on a sine wave slightly out of phase with the basic wave of infinity. The youngster who stood in his way would never reach any of the other planes because the peaks of the two sine waves could never coincide. He would be forever lost between the planes, in the "interdimensional void." Hannishaw congratulated himself on his own coinage of this last term. It sounded like a good place for Sherwood to be.

Work on the apparatus necessary to the final stage of the experiment was already along toward completion. The enormous transformers and regenerative projector mechanisms were in place within the confines of the huge pit in Section K of the laboratory. The cubicles which were to be used for the transportation of human beings from one plane of superspace to another were almost completed. The management of Amalgamated, and young Sherwood, of course, thought only one of these was being constructed. It was in this respect that Hannishaw had been most clever. It was essential to his scheme that there be two cubicles, and equally essential that no one except himself should know of the existence of more than one. One cubicle was being constructed in the great valley factories of Amalgamated, the other Hannishaw himself was assembling in an abandoned old machine shop from parts he had ordered under an assumed name from half a dozen widely separated factories of competitive corporations. No one of the independent manufacturers could possibly know the use of the particular part he had produced, no one of them could trace it to the science master of Oak Hill.

These cubicles were simple enough, being merely hermetically sealed rooms with oxygen apparatus and a number of sensitive recording devices. The walls and the single door were of laminated construction, comprising alternate layers of insulating material and a special metal alloy which was made to the specifications Sherwood had given to Hannishaw.

The swift progress of the work and the ease with which he had been able to perfect all details of his nefarious scheme were most gratifying to Hannishaw. It had been almost too easy. Sherwood, enthusiastic in the extreme because the final stage of his dream was to be realized much sooner than he had anticipated, and buoyed up by the master's lying promises of official recognition and financial gain, was more than tractable. He was indefatigable in his labors toward the very end his superior had planned. Hannishaw thanked his lucky stars for the gullibility which went with youth.

Even Miss Deane was acting differently. She seemed to have given up her interest in young Sherwood to a degree and was more receptive to the half-fearful advances of the older man. He was exultant and more than ever intoxicated with her nearness when in the office. But he did not swerve from his purpose. Perhaps there had been nothing more than a lovers' quarrel which might easily be mended. He must allow no maudlin sentiment to creep in now to change his plans.

Sherwood must go! After that the permanence of his own fame and the possession of delectable little Miss Deane would be assured.

ALL was in readiness. The official try-out of the final experiment was set for eight o'clock that night. It was not to be a public affair, but was to be witnessed by Amalgamated officials, three disinterested outside scientists, and representatives of the printed news syndicates. The radiovision news casters were not to be there at all; that would come later when the success of the transportation between planes had been proved. To-morrow, perhaps, a repetition of the scene would go over the air

waves; then would start the greatest ballyhooing campaign of the ages. Hannishaw had arranged it all.

It was the unofficial try-out in which he was for the present most interested. He had been careful that no one should learn of this, for it was in this try-out that Sherwood was to disappear.

He had told the young research engineer to meet him in Section K promptly at seven o'clock, and meanwhile, had sent him to Pittsburgh on an errand which would keep him from communicating with any one who might later remember his early appointment. There could be no leak anywhere. Even the night watchman would not know, for Hannishaw had contrived to effect his removal from the scene by means of a drug in his coffee.

Seven o'clock came. Promptly on the hour, Bill Sherwood descended into the pit of Section K. Hannishaw was already there, standing before the transport cubicle, rubbing his hands together in anticipation.

"Evening, sir," he greeted his superior.

"Hello, Sherwood." The master saw that the younger man's lean and angular form was tense with excitement, that an eager flush mantled his high-boned cheeks. His black eyes were alight.

All of which looked very good to Hannishaw. "I've been thinking, Sherwood," he continued, "that it might be well to try the cubicle in advance. Before the witnesses arrive. That is why I arranged for you to be here now."

"I suspected as much, and I agree with the thought. Not that I have any doubts, you understand, but—well, I am anxious for the experience."

Better and better. "One of us must stay behind to operate the controls of the projectors," murmured Hannishaw.

"Let me be the first to go, sir," begged Sherwood. "There will be a certain amount of physical discomfort, and I ——" He hesitated, knowing that his superior would resent the suggestion that a younger man was better able to stand the strain.

Hannishaw smiled hypocritically, the while his fingers were itching to be on the controls which would send the young meddler into the void from which he could not return. "Oh, very well," he agreed in a casual manner. "You may go first. I'll take the next trip." This was perfect. From the corner of his eye he saw the dark bulk of the second cubicle where it reposed in the shadows beyond the rim of the pit. Good thing he had got it there before the arrival of his victim.

Sherwood had no doubts at all. He knew that human life was safe in his method of transport. He had sent mice and guinea pigs into planes eighty-six and ninety-three, which were both in the same space-time location as the earth in the superuniverse. He had returned them safely dozens of times, breathing a little hard, perhaps, but otherwise unaffected. He knew that the tremendous energies of the regenerators, multiplying electronic velocities thousands and millions of times, would convert the substance of which his body was made up into different and inconceivable forms of matter for each plane he might visit.

He knew that, to the perceptions of an observer, this would appear to be actual dissociation of his being, but he knew as well the limitations of these perceptions and knew that the transposition of the unknown elements back into known and unchanged elements when he was returned to his own plane of existence would be accomplished instantly and without change in his life processes.

And so no thought of suspicion or fear entered his mind when he slipped down the side of the great concave bowl to the cubicle which reposed in its center. Had he looked up at the fiendish gargoyle that was Hannishaw's face, he

might have entertained some misgivings. As it was, he ducked into the door of the cubicle and shouted: "Let her go," before closing himself in.

Hannishaw treated himself to a derisive guffaw as soon as he was sure the sound could not reach his victim. "Now I've got him where I want him," he gloated, and the harsh voice echoed eerily in the vastness of the deserted laboratory building.

He closed the main switch which sent a surge of power into the transformers, then swiftly energized the coils of the regenerators. In the fraction of a second tens of millions of volts of energy built up into billions. The pit resounded boomingly to the enormity of the charge. The platform on which Hannishaw stood thrummed musically and with vibration so powerful as to blur his vision slightly. Before him was the battery of indicating instruments Sherwood had so carefully calibrated for extreme accuracy. The "Master of Science" peered at the synchronoscope and adjusted a control knob until its hand was just a fraction of a degree off the vertical position. That would be enough.

Then he depressed the activating button and there was the heavy thump of an oil switch beneath the platform. Lightnings flashed and thunders clapped in the pit, sending a chill of fear up his spine. He hadn't thought of the noise. What if some one in the valley heard?

But the cubicle had vanished from sight. In the trillionth part of a second its every subatomic particle and those of the man inside had been accelerated to eighty-six times the critical velocity, to the eighty-sixth multiple of what had been thought of as the speed of light. With reference to earthly space perception, it could hardly have moved in that short period of time, even at this tremendous and inconceivable velocity. Nevertheless, it was gone.

Hannishaw darted to the ultraperceptional viewer and flicked on its vision screen. There flashed into view the misty outworldly hues of the eighty-sixth plane, the twisted valleys and spired mountains. There was no sign of the cubicle. He shifted the plane synchronizer a hair and the unearthly colors vanished from the screen. There was only the blackness of the void between planes. He shifted the synchronizer again and saw the cubicle. His mounting chuckle merged into a bestial shriek. In the viewer the cubicle was completely transparent and in it he saw there were two figures. *Two*. The second figure was that of Cora Deane. It was clinging to the tall form of young Sherwood.

All of Hannishaw's carefully-built personal universe crashed about him. His scheming had been in vain. Without the reward he had promised himself in the person of this girl all the rest meant nothing.

"Good Lord!" he screeched. "I've killed her."

Bright lights flashed on and Hannishaw stared into a ring of faces up there at the edge of the pit. Bradley, he saw, the chairman of the board of Amalgamated. Other Amalgamated officials. Police officers. With a despairing cry he flung himself from the platform and across the secondary terminals of one of the huge transformers. His life was snuffed out in a blaze of pyrotechnics, of hot rushing gases.

WHEN Bill Sherwood shut himself into the transport cubicle, his sole anxiety was to be off into those realms he had hitherto only seen on the screen of the viewer. He knew there was something queer about Hannishaw's appropriation of his discovery, but had given up hope of doing anything about it. The master was too solidly entrenched in his position. Besides, Sherwood was essentially a scientist, and with the opportunity of actually visiting the planes

so soon had forgotten his original resentment in the work of preparation into which he was plunged. He was positively gleeful now with anticipation.

There came the throb which accompanied the pouring of vast energy into the primaries of the transformers outside the cubicle, and with it the flickering of needles in the instruments set in the cabinet at his side. Sherwood slumped into the cushioned seat which was there in case of weakness or nausea of the passenger.

In another moment, he knew every fiber of his being was to be seized upon by tremendous forces, that each individual subatomic particle would accelerate to the inconceivable velocity of something like sixteen million miles in each second. But there would be only the briefest, infinitesimal part of a second to endure it, and consequently no appreciable movement in relation to his own observation. The movement was related only to the superuniverse, incalculable in its swing along the enormous arcs of the space time coördinates.

Strange how many thoughts could be crowded into so short a time. A vista of perceptional heights, infinite in extent—— *Cra-ash!*—— The twisting and warping of all space——

But Sherwood had not lost consciousness. He thought he was out of his mind for a moment, though; Cora Deane was in his arms sobbing. Real, live—not a mental or optical illusion, after all. She had hidden in the cabinet.

"Corrie! Why did you?" But Sherwood was really glad. There wasn't any danger, of course, and it was good to have her here. He had hardly seen her these past days; now they'd be together to see the wonders. He switched on the viewer so they might observe where they had landed before venturing outside the cubicle.

A groan escaped him when he saw the thick blackness on the screen, an utter absence of light that was interrupted only by swift flashes of gray. Dead grayness flipping across his vision in sweeping arcs like the turning over one after another of huge pages in the book of infinity. And that was what it represented; they were driving *between* the planes, utterly and hopelessly lost in the infraperceptional regions of superspace. A glance at the instruments convinced him. There was no chance —unless Hannishaw, the blunderer, learned how to slip the phase.

His arms tightened convulsively around the girl as he went cold with fear for her. His lips moved soundlessly; he tried desperately to hurl mental instructions through the illimitable reaches of superspace. Had he known that the master was dead he would have despaired altogether.

"I've failed," the girl was moaning. "I tried to stop it, Bill, but couldn't. Now——"

"What do you mean?" Sherwood held her at arm's length, and for an instant forgot her peril in what he saw in the depths of her eyes.

"Hannishaw. He tried to do away with you, and now he's done it—or something terrible. I should have known they'd be late."

"They! Who?" It all seemed so impossible, so irrelevant.

Cora Deane dabbed at her eyes as she told him: "You wouldn't take me seriously, but I knew. At first I only wanted to prove to them that he'd stolen your invention, and *they* wouldn't take me seriously, even though I had a witnessed carbon of your first notes. So I hired detectives. They used dictographs—you see I knew Hannishaw had a habit of talking to himself, aloud. Then they believed. And more, they knew he was plotting to—to lose you. They got busy; officers of the company, police and everybody, and arranged to stop him in whatever it was he planned

to do to you. After you had showed me the apparatus that night, I planned to be with you when it happened. I only wanted to surprise you—being here when they caught him. But now—where are we?"

SO Hannishaw had deliberately contrived this thing! Many things became clear to Sherwood; definitely he gave up hope. His long arms infolded the girl once more. He couldn't tell her just yet that they had no chance, that they couldn't go outside because there wasn't any outside. That there was only imponderability out there, and—just nothingness. And that their oxygen inside here was good only for two hours.

"We're lost, aren't we, Bill." It was a statement, not a question. She knew, it seemed, but not the horrible details.

From the corner of one eye, Sherwood saw the pages move over more speedily across the screen. Then, unbelievably, there came a change. Leaves of white alternated with the gray and the ebony. "Corrie!" he blurted. "You had a carbon copy of the final thesis. What became of that—what did you do with it?"

"I—I gave it to Mr. Bradley. He had Conlon studying it all this afternoon. I thought——"

Hope flared anew. "You thought just right. Conlon is the smartest engineer in the lab. He'll dope it out. He'll get us back."

Those interleafed white pages meant that some one was trying to synchronize the lagging wave with the superuniverse characteristic. Hannishaw was licked, far more conclusively than either of them knew.

"I don't care if he does or not, as long as I'm with you." Little Miss Deane moved closer into the protecting arms for comfort.

And that was the way they were found by the anxious ones in Section K when at length Conlon had returned the cubicle and opened its door. It was some little time before the chairman of the board, Bradley, was sure that Amalgamated's new chief research engineer and the bride-to-be had actually returned to their normal plane of perception.

"The Son of Old Faithful" is a carefully constructed sequel to a very popular story. Raymond Z. Gallun reaches a point in this creation which places him in the stellar grouping. A thought-variant method of interplanetary communication is detailed—and the story itself is vitally interesting in the July ASTOUNDING

THE INVADERS

Here is the often-requested sequel to "THE MACHINE"

by Don A. Stuart

The machine had been still for three thousand years. It was forgotten by the wandering descendants of a race which had once been great. The earth was a garden. Worry was unknown.

JAN AND MEG had wandered off a bit from the others. They lay on a bank now, the soft grass feeling cool and somewhat tickly on their bronzed skins. Meg was eating an orange slowly, and every now and then sitting up to wash her fingers of the sticky juice in the clear little stream flowing from the spring, a quarter of a mile up the valley. Jan watched her every move, every graceful bend of her arms and back and neck with an interest and a strange tenseness he could not understand, and vaguely wondered at.

"Meg," he said softly. Meg did not turn her head all the way round to him, but looked sidewise, her eyes dancing, still smiling and sucking at the sweet, bright fruit. "Meg," he said again softly. She made a face and turned her back on him. Almost, but he could see her eyes were still watching him.

He laughed suddenly and held her close. "Meg——"

For a moment she held him, too, then suddenly she was struggling wildly, trying to say something, her mouth smothered by his kisses. It was several seconds before Jan realized she meant it. Then abruptly he released her and looked in the direction her startled eyes followed—straight up.

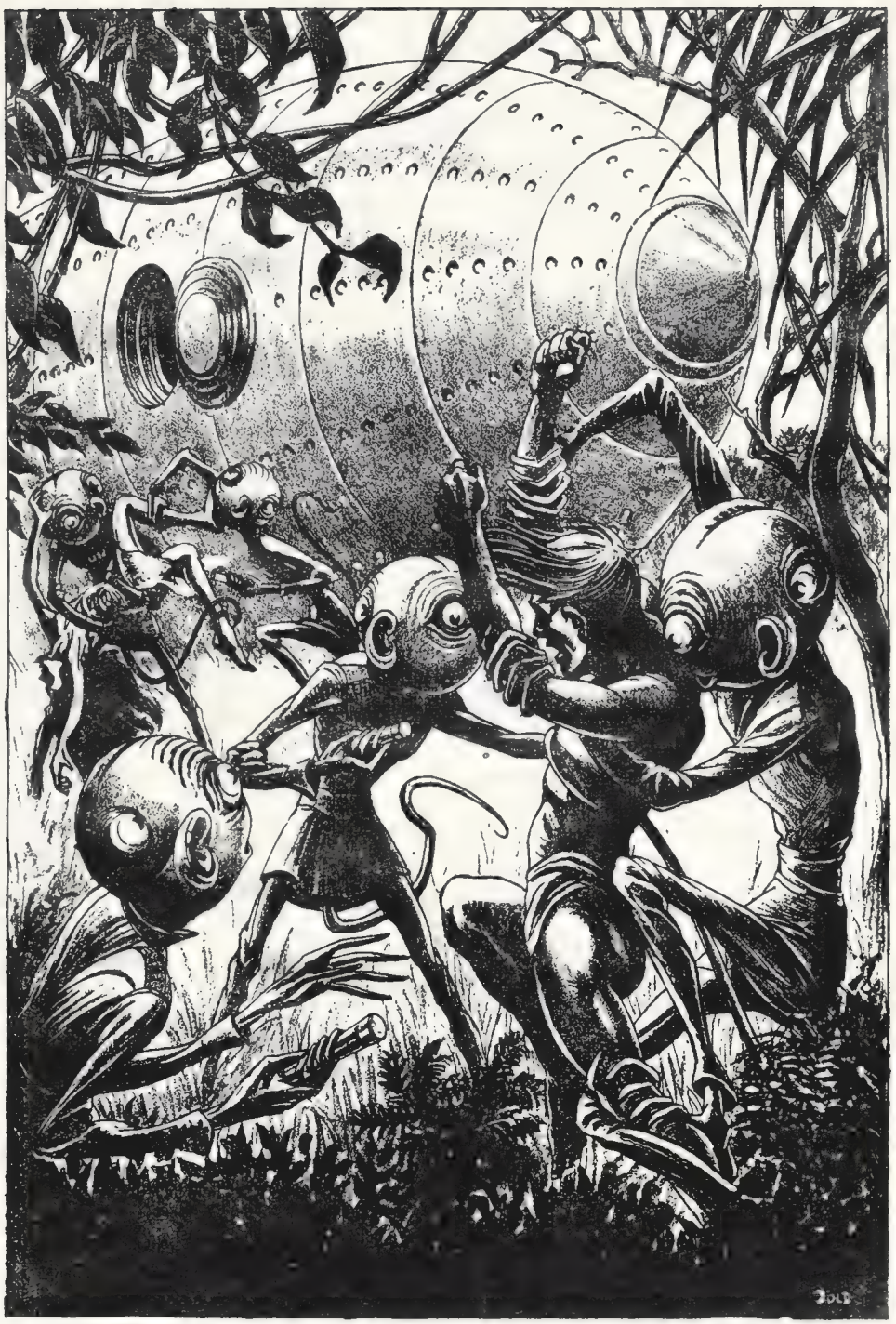
There was a patch of sky, blue as a sapphire, deep and so clear it seemed some perfectly transparent crystal, not the milky blue of the sky over a city, as we know it.

And it was framed in a ragged, wavering frame of deep, clear, green leaves, and fronds. There were palms, and orange and other fruit trees.

And far, far above there was something gleaming, gleaming with the hard sheen that those rare bits of mirror-metal which they found in the Ancient Places had. It was something big, Jan knew, by the way it moved slowly and yet gave an impression of speed. He did not reason it out—but he knew it was huge. And it was shaped like a banana, only a straight banana, and more rounded.

Jan helped Meg to her feet, and both stood watching the strange thing. It came down, very slowly, and very gently, like a bird circling to earth. It seemed headed straight for them, settling slowly. Politely, Jan and Meg moved over, out of its way, till the great thing floated gently down. First the palm fronds and tree leaves wavered, and sank, and the grass all below seemed to be pressed down. Jan and Meg felt a strange pressure that made them unaccountably uneasy as they watched it. They stepped even farther back, among the trees.

The thing was huge. The clearing was nearly half a mile across, and a mile and a quarter long, yet the great thing made even that vast place seem



Jan felt two powerful hands grip his arms, and two powerful feet take hold of his legs! Meg was caught, too, and was fighting as hard as he.

none too large. At last it settled below the trees, and halted, then dropped quite softly to the grass.

For minutes it remained motionless, and, the strange pressure gone, Jan and Meg came out slowly, hand in hand, straight and slim, their bodies bronzed by the semitropic sunlight. Slowly they advanced, looking curiously at the shining metal bulk.

Abruptly they started as a great section in the wall swung outward. Five strange things came out, warily, watchfully. They were tall, taller than Jan, nearly seven feet tall, and their bodies were small in the abdomen, and large in the chest. Their limbs were long and straight, and seemed more jointed than human limbs, but they were covered with cloths, as the Gaht-men covered themselves in the ceremonies, only these were finer cloths.

Their heads were large, rounded, they had no nose, and their ears were cup-shaped, flexible and moving constantly. They had no covering on hands or feet, and both were prehensile. As the leader turned somewhat, Jan saw, wonderingly, that he had a long, thin tail, as prehensile and useful as the tail of a monkey. He was carrying something in it. Faintly, Jan envied him.

And Jan saw further, that he had three eyes! One eye on every side, so that he could see in all directions at once. A very strange creature, Jan thought.

Meg was curious; she wanted to see them more closely. She was pulling at his hand now, and Jan followed, somewhat cautiously, feeling a peculiar emotion, something like the way he felt when he fell, as though he were going to be bumped.

The five strange beings watched them intently, two eyes of each focused on them, and curious little sticks raised in the prehensile hands, pointing at them.

"Who are you?" asked Meg, her voice soft and silvery in Jan's ears. The five made no direct answer. Only the leader said something in a strange way, like the Mez-kahns—the brown men from the south—something Jan could not understand.

"You aren't Mez-kahns?" asked Meg doubtfully.

The leader said something more. The five started toward Jan and Meg. Jan felt more acutely the falling feeling, and pulled Meg back. Reluctantly Meg came back a step. Jan pulled harder as the swift-striding strange people came toward them. Meg held back. And finally, they were in the midst of the five. The leader seemed interested, observing them closely. Jan looked at them curiously, reaching out toward the bright-colored girdle one wore. Abruptly the leader snapped something—and Jan felt two strong hands grip his arms, two powerful feet grip his feet, and two living ropes wrapped abruptly about him.

Acutely the fall-feeling came. He fought desperately. Meg was caught too, and fighting as hard as he. Somewhere he heard others fighting their way through the brush. The leader was calling out something, and from the corner of his eye, he saw dozens of the strangers darting out of the ship, and flying off into the air, like birds; but they had no wings.

Suddenly a tingling struck Jan, the light faded, and only Meg's cry lingered in his ears as the darkness closed in about him.

THE LIGHT was strange when Jan awoke. It was very blue, and his skin looked peculiar. It was a cool room, too, and the air smelled peculiar. He shivered slightly, and rose suddenly as the memory of Meg's cry came to him.

He was in a room like those in the Ancient Places, but this room was not fallen in, and it was made of stout metal. There were others in the room too; Kal, Too, Pahl, half a dozen others.

and old fat-bellied Tup, the Gaht-man. Tup was still sleeping. Kal and Pahl were moving restlessly now, the others twitching slightly.

But Meg wasn't here! "Meg!" he called suddenly. There was no answer. The sound seemed to rattle down the metal corridor, and Jan went to the barred wall. There was a long corridor. At one end it opened into a large blue-lighted white room. The other end was out of his range of vision. But across the way he could see another room like that he was in. It, too, was barred. There were women there; some girls, one very old woman. But he could not see Meg. He called again.

Suddenly one of the strange creatures came. It looked at him with two of its eyes, and barked a command. Jan felt the fall-feeling and stopped calling. He whimpered Meg's name softly, then his attention was attracted down the corridor to the white room. There were several strange creatures there now. And a little table that slid across the floor on funny round feet like a slice of an orange. Then he saw Meg.

Meg was on the table, sleeping. He called her name and the creature outside barked at him again angrily. Something hot stabbed at his chest. He cried out softly, but stopped calling Meg's name, and watched her.

Suddenly he was angry. Meg was his girl, but these strange creatures had taken her. He started to call out, but stopped in memory of the hot flash of light that came from the strange creature's little stick. He whimpered Meg's name softly.

Meg's eyes were closed, and she seemed to be sleeping very soundly or in a faint. Jan watched, and called her name softly to himself. The fall-feeling came over him again, till his stomach was all tight in his body, and his throat hurt him.

One of the strangers had something in his hand, something bright like the mirror-metal, and he was bending over Meg now. He made a swift movement, and even the fear of the guard's tube could not quiet Jan as he cried out desperately. For suddenly he saw Meg's smooth warm skin split open all along her abdomen, and the carmine-red of her blood welled out suddenly. Her body changed in an instant from something slim and beautiful and bronzed to a horrible thing of red.

The lurid flashes of the tube did not silence Jan till they sent him back, far in a corner, quivering, his eyes blank, exhausted, fearful. He was muttering Meg's name softly and shaking all over.

It was nearly an hour later that he ventured again to look into the white room under the blue lights. There was something awful and red on the table with the funny feet now, but he couldn't know that it was Meg, so he thought she was gone somewhere else.

THERE WERE others who went to that white room with the blue lights. Jan only knew they had gone. Old fat Tup, the Gaht-man, went, and Theel, Yal's woman, and his child, but Jan sat in one corner, very quiet now, nursing his chest and back, which were raw and blistered from the ultra-violet burns of the guard's little stick. He was very quiet, and he moved very slowly. His stomach felt tight in him, and his throat hurt all the time, and with all of him he felt a great emptiness, because Meg wasn't coming back.

The second day they brought fruits and some things which were not good to eat, because they hadn't learned yet all they must know about this strange world and its inhabitants. The others in the cell ate the fruit, and because the guards were not so strict now, since they were not afraid of these humans, the men were allowed to call to the women across the way.

That day they brought in more humans and Yal was among them. The

guards had to remove him because when he heard what had happened to Theel and the child he tore murderously at a guard who came close to the bars, and crouched back craftily in his corner and laughed and chuckled till the men in the cell edged away from him and his strange, roving eyes.

The fifth day each of the men was fed separately, and the strange creatures, who called themselves Tharoo, watched them. Jan would not eat much, but the little he ate made him horribly sick; so sick he did not struggle when one of the Tharoo carried him out, tested him carefully, and gave him something else. In an hour he was feeling well. But one of the others was in a cramped ball of agony, the death he had suffered still frozen on his face.

The seventh day a change was made. Jan had learned a few of the words of the Tharoo. A guard came in and the seven in the cell were herded out, through the long passage of the ship. Outside, Jan looked about in some surprise. Nothing affected him much—only the emptiness within him. But he must be somewhere else. The clearing was gone. There were metal houses now, and a great thing of whirling, moving parts. There were Tharoo flying through the air, towing behind them great masses of the metal they had taken from the Ancient Places.

A Tharoo led the group to one side of the clearing, where raw earth had been turned up by the moving machine. With a flat thing he dug a hole, first breaking up the clotted lumps of earth, and then into the hole he stuck a dead bit of wood, scarcely an inch long. Then he covered it up and stepped on the place.

"Do," he commanded, and handed the flat thing and some of the bits of wood to Jan. Jan looked at the flat thing, clumsily stuck it in the earth, and did as the Tharoo had done. He did it twice, but it was uninteresting. He wanted to go into the shade of the trees and lie on the bank where he and Meg had lain, and think about Meg. He dropped the flat thing and turned away.

A searing flash in his side made him leap and cry out. The Tharoo was glaring at him angrily. "Do!" he roared, motioning to the flat thing and the bits of wood.

Jan learned to plant in three lessons. And beside him, in seven rows, seven others learned to plant. Jan had never planted, nor had any of his fathers for nearly sixty generations. Nature had tended to that, and Jan had merely picked the fruits. Now he worked under the semitropic sun, and he worked stooped over. Presently his back ached, so he laid the flat thing down to go among the trees and rest. In an instant a guard was on him. Again the searing flash, again the roared command. Jan "did."

At night there were fruits, and many more humans had been brought in. The next day Jan and the others planted. At noon they stopped. Jan's back ached horribly and the emptiness within him grew. In the afternoon they were set at a new task. There were strange, long, flat things, and they were taught to saw. Great trees came down—hardwood trees that produced no fruit, no flower.

Another whirring, shrieking thing of metal clamored all afternoon. A heap of boards grew—raw, green boards—and Jan and the others learned the art of hammering in the strange cleats of the Tharoo. At sundown a row of twenty rough shanties had been built.

The next day they were furnished with simple chairs and beds. The Tharoo covered the beds with an elastic sheeting that held Jan's weary back comfortably as he rested at noon and ate the fruit other humans had been sent to gather. That night Jan was put in one of the shanties, and on a

high metal tower a Tharoo sat with one of the strange little sticks that made a man unconscious when it glowed, and watched over the shanties.

JAN was a powerful young man. Some twenty-five times he had seen the rains, as the sun swung north, then south again. He stood six feet tall, a good four inches above the average, and his muscles were smooth and lithe with the easy but active life of his people. His intelligence was moderate for his race and time. For two thousand years no human being had had to think, or work, or escape danger. Two thousand five hundred years ago the Machine had left Earth, and the paradise it had left the planet remained, free of injurious creatures or disease. Man had had no need of intelligence. The witless lived as well as the shrewd. There was nothing to drive man, so he had fallen easily, gently down. Jan was fairly intelligent for his race—but he was not intelligent.

He did not understand when Wan was brought to his cabin. She looked at him for a moment in fear, then her big dark eyes opened wider in relief. "Jan," she said and went in.

"Stay," said the guard, and left.

"Wan," said Jan dully. He wondered vaguely why she was not with little Tahn, where she belonged. Wan was a big girl, tall, and well-muscled, with keen, bright eyes and a not-too-beautiful face. She was larger than many men, larger even than the average man, and a good six inches taller than Tahn. Though she did not know it, nor did Jan, she was exceptionally intelligent.

Jan ate the fruit that was brought them, lay down, and thought of Meg, and went to sleep. Wan watched him for some time. Then she, too, went to sleep.

For a week Jan worked at the building of the cabins. Then he learned to string wires between metal posts around the whole camp, and because he was growing used to work, his muscles hardened and gradually work became easier.

There were more in the camp now, many more. All the tribe Jan had known, and more. They came, and gradually they were forced to work, and to live in the cabins. There were two big ones—for many men in one, and many women in the other. And perhaps a hundred small ones.

Then one day Jan was transferred, and on a strange, flat boat with rounded, upturned edges he floated away, high across the forests, to one of the Ancient Places. Under the directions of the Tharoo, he dug, and turned stones and worked all day, and his back ached badly that night.

Wan watched him as he turned and twisted that night. Then she went over to him. "Jan, I will help," she said. Jan listened to her voice, deep and clear, and thought of Meg's silvery voice. He groaned again, then sighed as Wan found the stiff muscles with powerful fingers and soothed them expertly. He fell asleep as Wan kneaded the stiffness from him.

He thanked her when morning came, and thanked her again that night when she rubbed the stiffness from his muscles, and wondered vaguely why Wan was not small and slim like Meg, but like a man in her strength.

A THAROO in clothes of a different cut came to the cabin that day when Jan was gone and took a sample of Wan's blood and examined it, while Wan watched with keen, dark eyes. A slow half understanding came to them, and she looked intently into one of the Tharoo's eyes, and the Tharoo looked at her, and a strange passage of mutual estimation took place. Wan understood something of the Tharoo scientist, and the Tharoo felt a strange sympathy and understanding within him.

This woman of a race once as great as his own, a lone specimen behind whose strange double eyes shone a still-living intelligence and keen understanding.

Those men of the Tharoo were not such as their descendants became. These were men great and bold, men of fine ideals and high courage. Across twenty-seven light years of space the ship of Tharoo had come, and the four other ships with her. Picked ships they were, with picked people; people picked for courage and stamina and fine character. They looked at man and saw in him the fallen remnants, the scattered blocks of his character and attainments tossed down and jumbled as the great stone and metal blocks of his great cities were scattered and tossed down.

They were all there still. All the parts of the vast edifices man had reared were there—scattered—jumbled. All the parts of man's high intelligence and character were still there in his descendants—scattered—jumbled.

With tender hands and keen minds they reconstructed from these scattered, jumbled blocks the great buildings that once were. And now, from the scattered, jumbled remnants of man's character they were trying to re-erect his character and intelligence.

Wan perhaps sensed something of this. At least she grasped something of the message which that drop of red on the slip of grass had told the Tharoo as he peered at it through his strange tube. She craned her neck, and the doctor bent aside. She looked through the tube, and saw in it a sea, filled with strange yellow fish, round and sunken in the middle, and other creatures swimming slowly, and changing always. And a bit of something black that strange, colorless, jellylike things were tearing at savagely. Wan stepped back and looked. Only the slip of glass and the tiny drop of carmine.

She shrugged her shoulders, and slowly turned away to her work. All that day she worked with a curious half smile. Perhaps she wondered what the Tharoo would do about whatever message the little tube had brought. She watched him as he tested one after another of the women of the cabins, and none of those in the great lodge.

Jan found fruit and a new liquid waiting when he returned that night. It was deep blue, and smelled enticing. He tasted it gingerly. It was good, and he drank it. And somehow, that night, when Wan rubbed his back, he did not think of Meg, but of Wan, and Wan looked different. He decided perhaps it was Wan he loved instead of Meg——

For chemistry was far more powerful than Jan's not-too-able mind.

II

TO THE COUNCIL OF CHIEFS OF THAR,

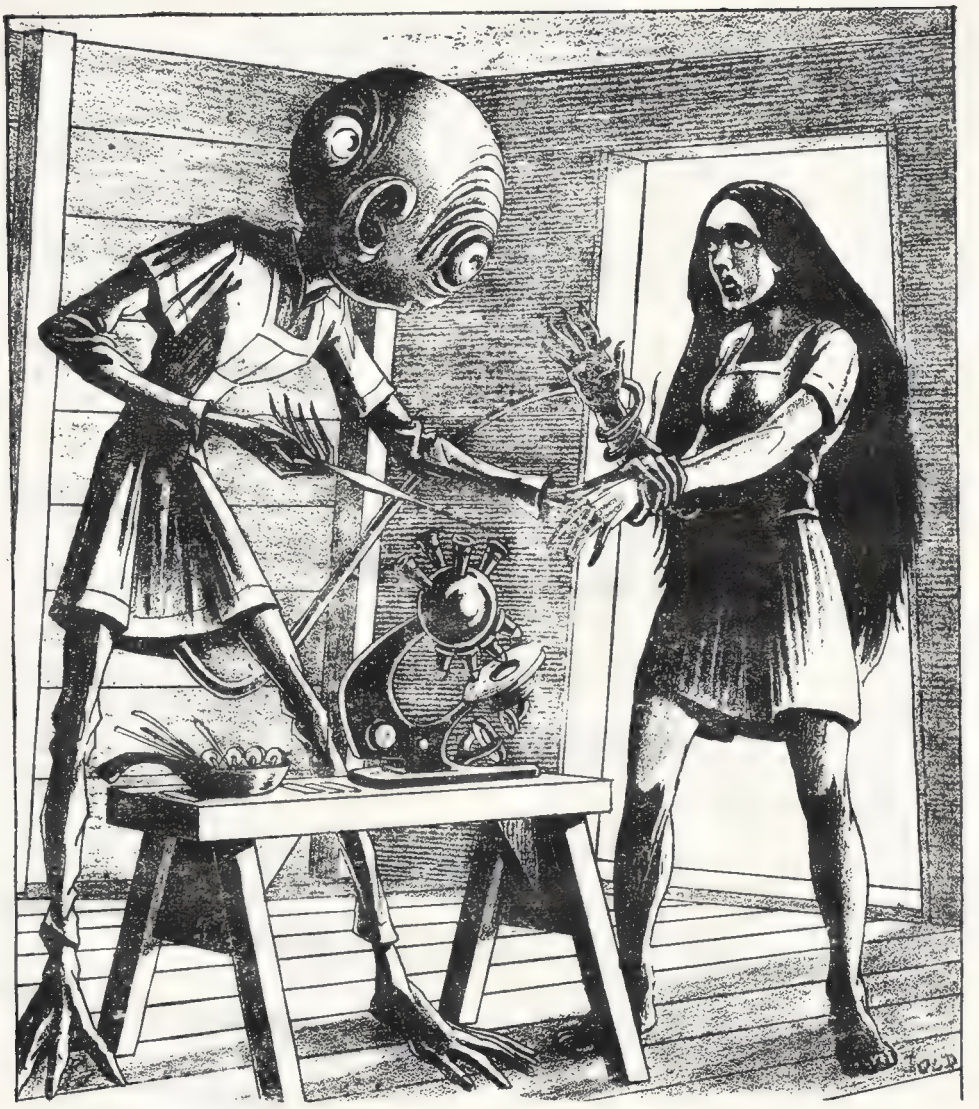
Greetings:

I, Tarwan Rorn, Commander of the First Detachment of the First Expedition of Colonization, make report on this, the third month of our stay on the planet Artd, as the inhabitants know it, and the thirty-seventh day of the forty-fourth year of the expedition.

This represents the last message cylinder in our possession.

With its sending, our last ties with Thar will be forever severed, for it will be many years before we will be able to again find a stock of fuel sufficient to power a message cylinder capable of reaching Thar, and, we fear, long ere then, Thar will be no more.

We were able to reach this sun and its habitable planet with the very dregs of our fuel. The system consists of nine major planets and an infinitude of tiny meteorlike bodies. But two planets were directly habitable, and two ships have landed on each planet. The flagship, under my command, landed on the third planet in order from this sun, as the enclosed report of the astronomers



A Tharoo in clothes of a different cut, came to the cabin that day. He took a sample of Wan's blood and examined it while Wan watched.

will show. The remainder of the flight landed on the second planet.

The other eight ships of the First Expedition left us shortly after the last message cylinder was sent, seeking in other directions for places suitable for colonization. I fear that they will have been unsuccessful. We were forced to visit a vast number of stars before this was chosen, by the greatest of fortune.

Let it be as it may, we send this word that though Thar must be destroyed in the coming disruption of her sun, the Tharoo shall not die from the Universe, though necessarily so many millions must perish. This fragment of the race lives to start up anew.

We are not the first race to live on

this planet. There was a great race here. Many ages ago they built their great buildings of stone and metal, stone white as salt and red as bromine, metals blue and golden and silvery. They built towers then that stretched a thousand feet into their sky, as blue as copper sulphate, and their gardens covered the ground below, green and crimson and blue. They had machines that flew effortlessly through the air, repulsing gravity, machines completely automatic that thought for themselves. Machines made their food and their clothes, and they needed almost no direction from the race. They were great, greater perhaps than our race. And in all their cities we find no trace of weapons save as museum pieces. There is in all this world no dangerous animal, and apparently no disease.

They fell. There are descendants of this race of the rainbow cities and the thousand-foot towers outside the ports as I inscribe this record. They are a strange race, with a mop of close-curled hair on the top of their heads, but two eyes, working always in unison. Their feet are not prehensile, nor have they tails. They use only their hands. They are shorter than we, but more powerful, their compact bodies sturdy to resist the somewhat higher gravity of this planet.

And in their eyes there is not the intelligence that built the rainbow cities, nor planned the gardens. Nature makes the gardens of this world now, and the sun warms them. They wear no clothes, for the air is warm. It is fragrant to them, with the perfumes of the myriad flowers of their garden plants, run wild now. The forests that cover the planet from north polar cap to south are thick with the fruits that feed them. They never work in this paradise.

We are too few to do the vast labor that must be done. So they are working for us—and in return we shall attempt to do something for them. They do not know; did they, they would not desire it. We are trying to resurrect the race that built the thousand-foot towers of white and garnet and gold; we are trying to breed them back to what they must have been. We cannot see how so great a race could have fallen so suddenly. And—for a time, it seems, so low. We have found the bones of these people in and about their cities, and the bones are charred with fire, and gnawed by teeth. At one time, shortly after the fall, they must have become cannibalistic.

They are not now. They are peaceful, a strange gentle race. We have made them do much work about the cities, the "Ancient Places" as they call them. They are very strange in their reactions to us. They do not hate us, nor do they try to fight against work. They merely prefer the cool shade, and hunting the fruits of the forests.

AND it is a strange sight to watch them among the cities. The Tharoo stand about, and the archæologists instruct them, and guide them, and they look up with their strange paired eyes in curiosity and wonderment. They grub among the ruins of their rainbow cities and do not know their ancestors built them, nor appreciate the magnificence that once was there and that still is.

The thousand-foot towers lie in jumbled masses, their salt-white surface blocks cracked and powdered by the fall, their pure color distorted by the rust-red streaks where the steel frames have melted away in the rains. Most of the tall buildings have fallen as the slow etching of time destroyed their bones. The great girders of steel and the walls cracked, and caved, and fell to the ground.

But here and there one remains, perhaps with portions of its gleaming-white walls fallen, and the glistening frame showing, for many have framework of steel as uncorroded as the day

it was rolled out in the presses that have long since decayed. It is stainless. And in others the framework remains whole and unrusted, but it is twisted and ruined. The metal is soft and silvery. The archæologists, in testing it, exclaimed that the buildings could ever be built of such stuff. A metallurgist found the answer. It will be of interest to us.

The metal is nearly as soft as annealed copper, yet once it was hard and strong as steel. It is an aluminum alloy, like our alloy duraluminum. The metallurgist has restored its strength by heat treatment, and it is even stronger than our best alloy. It seems to retain its strength permanently and to increase in strength with time, as does ours. But in the long time that has passed, the strength leaked out of the metal and, as it softened, the building crumbled.

Some buildings stand whole. Low, and beautiful, set amid gardens once, covered almost by the semitropic forests now. They stand white amid deep green, their airy columns seeming to float the buildings. They are more beautiful than any ever built on Thar.

And the Mauns, as the race calls itself, look at them, and wonder perhaps at them, and aid the archæologists in clearing the rubbish from their doorways, and removing the débris of their own occupancy.

There are certain respected ones among the Mauns—god-Maun they are called—who object, for these things seem to have some meaning to them. Bits of wheels, bits of gears, bits of drive chains. They seem to have some reverence for machinery. They will polish our machines, these god-Maun, with a strange air of reverence, though they do not understand more than the simplest bits, such as the interworking of gears.

The Eugenists are working with the best members of this race. Many have been chosen for their remnant of the once-great intelligence the race must have had. Others for their magnificent and beautiful physique. For they are beautiful animals, their flesh smooth and firm, the muscles working in swift curves beneath their brownish, hairless skin.

But they are meeting with some difficulty, for these people are not mere animals, to be bred at the choice of the Eugenists. They still have intelligence, and with intelligence comes will and choice. Certain couples, poorly matched, have chosen each other, and remain inconsolable and unhappy when separated, and refuse to mate with other and fitter mates.

They are separated for a bit, and chemistry plays a part, and gradually we hope to restore to this race the heritage they have lost. But it is hard, too, to select good stock. We know nothing of their past. The doctors and the psychologists are devising tests, and working very hard at the problem of calibrating them.

They are as engrossed in the task as any, for two reasons. The strange history of this race has caught their imagination. The mystery of their fall—the sight of these strange, unknowing people grubbing among the ruins of their greatness without the faintest recognition of their ancestors' achievements. And never was such a problem given to physicians—the task of raising a race to intelligence!

It will not be a matter of years, but of generations. Arthal Shorul, the Assistant Chief Eugenist, feels that the best answer lies in the inbreeding of pure strains, and a final outbreeding to the desired qualities. Waorn Urntol, his superior, feels that this is a quicker, a more scientific way, perhaps, but one less desirable because of the intermediate results of cripples and monsters.

I agree with Waorn Urntol, yet I fear that Arthal Shorul may win in the end, for he is younger, by half a century,

and this is a matter of generations, in any case.

It is hard to decide which is the better way—these friendly, gentle creatures are so pleasant, so likable——

III

JAN-1 looked up slowly to the young Tharoo entering the room. He stood tall and slim in his white cloak of the Medical against the silvery gray of the metal wall. The young Tharoo looked down at old Jan-1 with a pleasant smile.

"Greetings, Jan-1. Feel better today?"

Jan shook his head slowly. "No, master, I do not. All my muscles hurt. It is the rains. I will feel better only when the summer comes. Even under the lights it is no good. They used to help." Jan-1 looked up at the blue-white glow of the room light. "But"—he shook his head—"they are no good. Wan used to rub the pain out of me," he said sadly, and smiled softly at the Tharoo, "but all your learning will not do so much." He stopped a moment before he went on. "But that was twelve years ago now. Jan-12 was a little boy then. He has his house now."

"I was speaking to Jan-12 this morning about you. You will have another grandchild soon, Jan-1."

Wan-4 looked in at the doorway for a moment at the sound of voices, and bowed slightly to the Tharoo. "He is no better this morning, master?" she said.

"Your father will feel better soon, I am sure, Wan-4," replied the doctor. Wan-4's face altered slightly as she retreated. Jan-1 shook his head slightly, sighing.

"No, you are wrong. Only the summer can help my old muscles. I have known this longer than you, master." He smiled with wrinkled old lips. "I can remember the Landing, and that was nearly fifty summers ago. You were not, then."

Ranoor Trinol laughed. "No, but it may be I have learned more still. And," he said gently, "here is something that will relieve you of that ache, Jan-1. It is evening now. Take it, and you will feel no more ache, I promise you."

Doubtfully, Jan-1 drank the pleasant-smelling liquid. "I doubt it," he persisted, shaking his head. But almost at once a pleasant lethargy came over him. In five minutes the ache was gone.

Fifteen minutes later his ten living sons and eight daughters came into the little room, with four of his grandchildren. Silently they helped to arrange the tired old body for the final disposition. Ranoor Trinol stepped out then, and reported to the Directing Council of Maun Eugenics that he had carried out their recommendation.

IV

WAORN URNTOL, Chief of the Eugenists, died. It had been inevitable, as inevitable as death always is. It was sixty-three years after the Landing when he died, an old, old Tharoo.

Arthal Shorul, formerly second in command of the Eugenists' division, took over his post. Arthal Shorul was highly efficient, a trained scientist, his whole mind and energies bent toward the most rapid advance possible in his fields. There was an immediate reorganization of the Eugenists Department.

Waorn Urntol had hoped to establish a tradition in his work with the strange Maun race, a tradition that would continue. For sixty-three years he had made the course of his efforts smooth and the efforts of the others had been carefully directed in the same smooth channel, till, even at his death, he believed the smooth, well-worn groove would be followed. For withal that he was a great scientist, he had been a

kindly being, a being understanding of emotions as well as of results.

There had been two courses open to him in his great work of raising again the light of intelligence in the Maun race. He could work as did evolution, breeding always among different strains, emphasizing the best strains, slowly breeding up to the best in each generation, and with each little advance over the best of the last generation, breeding to the new peak.

Or—he could work harshly, swiftly, as only artificial breeding experiments can. Root out the evils, let weakness kill weakness by combining in one individual till the very concentration of weaknesses killed. Inbreeding, brother to sister and son with mother till every slight characteristic was distorted, and by its distortion, magnified into detectability. So that a slight tendency to nervous instability became stark lunacy, till a tendency to short life became certain death as an infant—and killed the tendency to short life along with the infant.

Waorn Urntol, being influenced somewhat by emotions, had mated one strong man to one strong woman, and hoped for stronger children, and repeated with other couples.

Arthal Shorul, being a scientist of pure fiber, went over the carefully written notes of Waorn Urntol, and looked through the growing card index, and marked certain cards with blue and certain others with red, till, when he was through, there was a file of some two thousand five hundred cards, edged in blue, and over eight thousand edged with red.

Two thousand five hundred Mauns, just maturing, or only recently matured and mated, were picked. There was a new camp built off to one side of the old Maun Settlement, to the west of the rising metal spires of Landing City. There brother would be mated with sister. Progress would be swift and scientific now.

There were those Tharoo Eugenists who did not like this changing of well-worn grooves, and they worked with the eight thousand or so who still lived in the original settlement.

The younger of the Tharoo Eugenists welcomed the change, and were transferred to the new group.

And, in general, life went on the same. For the majority of the Tharoo, all Eugenics was concentrated in the care and raising of many infant Tharoo. Centuries before the Tharoo came, a human scientist had said, "Nature abhors a vacuum." There was a vacuum of Tharoo on Earth, and nature was remedying this condition.

Landing City grew steadily, the metal needle-spires of the city creeping outward rapidly. But in time a new city was founded; then other cities. The labor of city building was great, and because the Tharoo were few, the Mauns were taken along, that they might help.

V

FIFTY YEARS after the Landing, in commemorating the event, Waorn Urntol had said: "It is our greatest task, and our first duty to this planet which has furnished us a new chance for life, to raise again the intelligence of this race which has so strangely, so suddenly, fallen to abysmal ignorance. What mystery lies behind this fall? Perhaps, in raising them again, we may find the secret. But first—we must aid them not merely to solve the mystery, not merely because they belong to the planet, but because here is an intelligent fellow creature whose mind has been beclouded. We must aid and strengthen the sick brother. Can a race do less for a race than an individual would do for another individual?"

One hundred years after the Landing, in the ceremony of commemoration, and

the dedication of the great Central Shrine that housed the Ship which had brought them across the inconceivable distances, Tagrath Keld said: "We have already made progress, we Eugenists, in raising Maun's intelligence. Certain of our specimens show distinctly good intelligence. The great experiment is progressing slowly, to be sure, but steadily. The original Mauns were almost totally unable to coöperate, but already great advances have been made, and their abilities to aid, and obey directions are increasing rapidly. There are many lines of investigation opening to us constantly. So great is the problem, that still many years must pass before the details of the research can be properly laid down. A problem of such scope has never before been encountered by any Tharoo scientists in their research."

Two centuries after the Landing, one Tagrath Randlun was the Maun Eugenist in command. In part, he said at the Commemoration of the Landing: "Every year we are getting better control over the Maun Eugenics problem. The original group of two thousand five hundred has been multiplied to more than fifty thousand, while the other, once larger, group which was not actively controlled by us has almost died out. Every year sees a more perfect approach to the attainment of the ideal—the ability to predict definitely what type of Maun will result from a given crossmating of our purified strains. We are attaining, also, greater and greater diversification of types. The usefulness of the Mauns is increasing rapidly."

In the celebration of the Third Century, the Mauns were referred to only briefly, by one of the orators. "Had we not found, on this planet, a semi-savage race capable of direct utilization in the mighty labors of our forefathers, who might say what ages must have passed before our conquest of the planet was so complete?

"Let us give thanks, then, to Great Mahgron that he, in his infinite wisdom, caused this strange race of Mauns to be created on this far, far distant planet eons before our forefathers landed."

VI

AS THE messenger left him, Hol-57-R-31 trembled slightly. He looked again at the brief line of symbols which called him to the Tharoo Head.

Silently, but swiftly, he packed his apparatus back into place, swinging the microprojector into its case, running his hands over it with a caressing movement. Finally he locked the bench cabinet and jerked abruptly toward the doorway. The yielding, spun-metal flooring muffled the tread of his heels, irregularly betraying his nervousness, his hesitancy.

Finally he reached the outer door, crossed the Eugenists' Court and entered the Tharoo Eugenist Bureau.

Then, for one instant, the slight slip the Tharoo Eugenics Department workers had made some generations before betrayed itself again. Almost, history changed its course.

For a brief instant Hol-57 stiffened, turned abruptly, rigidly, and took two powerful strides toward the door. A magnificent specimen of humanity; six foot two in height; his bare torso muscular, browned and lithe with muscles; his carriage erect, forceful; his keen, intelligent face stern and determined, held high on a graceful, muscular neck above broad shoulders; a powerful, dominating figure.

Then, in an instant, some subtle thing escaped. The body was still powerful, lithely muscled, still a magnificent specimen—but suddenly it was a magnificent specimen of Maun Type R-31. It was not dominating, nor forceful. It was fearful.

Hol-57, of Type R-31, turned slowly, and went on toward the office of the Tharoo Head.

A Maun female, of the secretarial type, M-11, looked up at him, glanced at the tattooed identification, and pressed a button. A musical hum sounded in the inner office, echoing a moment later in the lower hum of an enunciator in the front office. The secretary nodded, and Hol-57 went on in.

He folded his arms in salute as he entered the Tharoo's office, and lowered his head.

"Tharoo," he said softly.

Grath Munl looked at him keenly with two eyes.

"Hol-57, I have a communication from you here. Did you not receive my veto?" he asked sharply.

"Aye, Tharoo."

"You did!" roared the Tharoo Head of the Eugenists. "Then what in the name of Great Mahgron is the meaning of this? Did you actually send this second outline of your plan? I vetoed it—it would mean the breeding of a Maun type undesirably ambitious and possessing initiative to a degree I do not care for.

"I vetoed this. What defect in you caused this unheard-of action—questioning my actions, arguing with me?"

"Because I have been trained to seek ways of increasing the economic value of the Maun types. Because I have studied the statistics and learned that scarcely a score of new, useful ideas, inventions, have been produced this year. Because I saw a need for a class capable of original, different thought. I presumed to send a second recommendation of my plan because I did not think you had fully comprehended the reasons for my suggestion, and the need —the economic need—of such a type."

Grath Munl swung his third eye into position, by inclining his head and looked at Hol-57 very coldly and very long. "'You thought,'" he quoted very softly. "You thought I might not have comprehended and took a most unwarranted, undesirable step—and showed altogether too high a degree of initiative."

He paused for a moment, raised his head and looked at Hol-57 again with but two eyes. Then he continued coldly. "R-31 is an assigned research problem type, and in research types we have been forced to permit a rather high degree of initiative. Evidently your type is particularly undesirable. Fortunately you represent a fairly new type of scarcely seventy individuals, male and female, adult and young.

"The type shall be discontinued. The existent members shall be destroyed. At once. Report at once to Gar-46-N-3."

For a single instant Hol-57's great body stiffened again. He remained rigid, undecided. But just for an instant.

Then, slowly, he relaxed as Grath Munl turned away and pressed a tiny stud.

"Aye—Tharoo," he said softly as the huge Gar-46 entered, a giant seven feet and a half tall, muscled as Hercules never was.

"Aye—Tharoo," he repeated even more softly. In the vocabulary of the Mauns, "Tharoo" meant "Master."

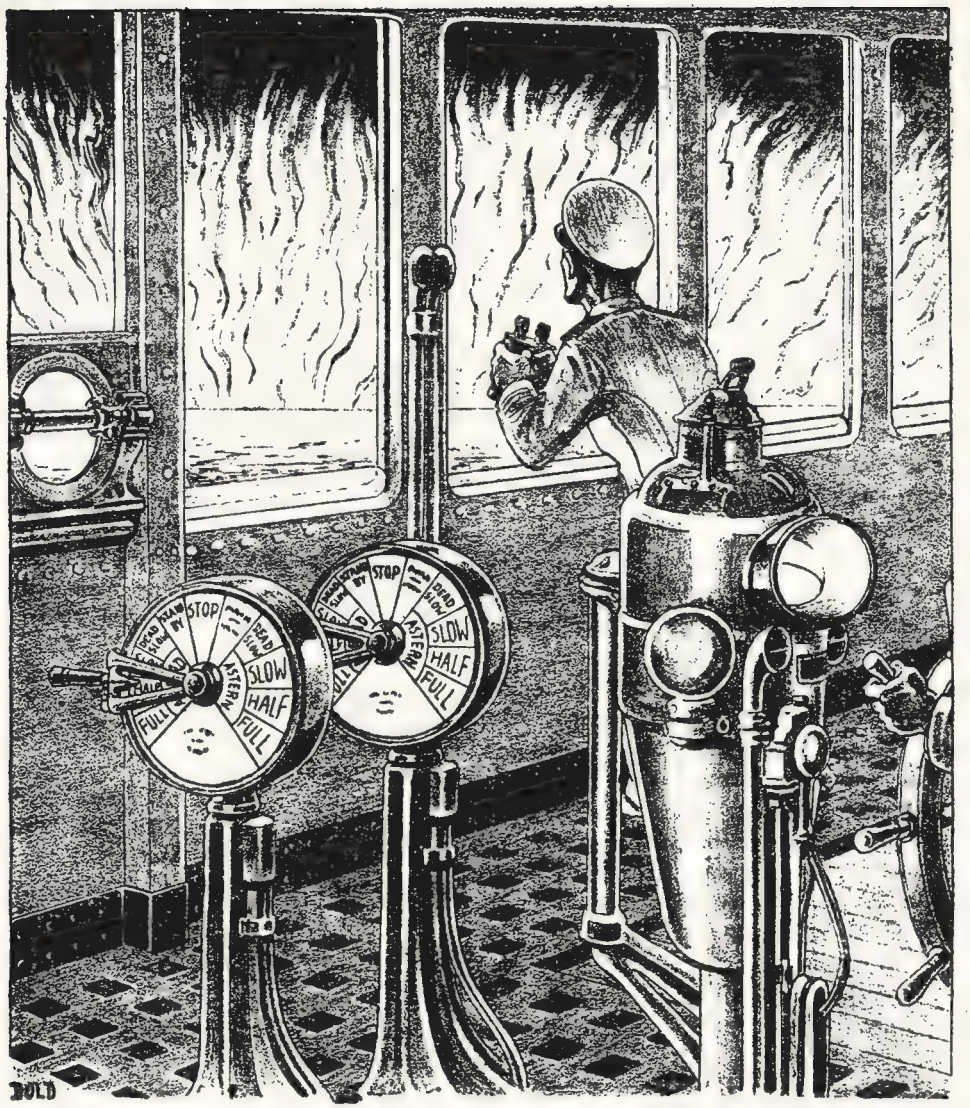
For the Tharoo were the masters. They were the intelligent race for which the planet had been created. They had always been the masters. They always would be. The Maun knew no other time.

Gar-46 took Hol-57 in his charge, and with him, in effect, type R-31, which had shown an undesirable degree of initiative.

TWELVE EIGHTY-

Part Two of an epoch-making serial in superscience fiction

by JOHN TAINE



SEVEN

Patches of brilliant orange appeared with startling distinctness in the midst of dark-green expanses, and blotches of angry red alternated with violent blues, dull mauves and sultry purples.

UP TO NOW:

The President's emergency committee, including Secretary Winters, Redding, Admiral West, General Green, Senator Atkinson and Dr. Lawton, tries to discover what a certain foreign Power is doing to the United States. After the Great Drought, in which the agricultural States were devastated by heat and wind, enemy agents convinced the Department of Agriculture that their secret fertilizing "dust," sprayed over

the dead soil by airplanes, would restore fertility.

To avert starvation and revolution, the United States signed a trade treaty, getting sufficient dust in exchange for its food surpluses shipped to the enemy. Government experts had been unable to determine the chemical nature of the dust which had quadrupled fertility. Army secret-service agents reported also that the enemy was using an unknown metal in its land tanks. Mobilizations and fleet maneuvers of the enemy have alarmed the government. Atkinson says the war will not be fought by armies and navies; he believes the enemy is fighting us with the dust.

Lawton's men, combing the country for young talent, unearth Jay Jarvis, heir to the defunct fertilizer monopoly of the United States. Jay, age 23, has just graduated with highest honors in physical chemistry. His university friend, Count Tori, of the enemy, has been doing advanced work—unsuccessfully—in modern chemistry. Tori guesses that Jay is trying to discover the secret of the dust, and offers him a position on the enemy research staff, of which he is commander-in-chief. Jay has attracted Lawton's notice by his Gibbs' Prize paper on an extension of Mendeléeff's periodic law of the chemical elements.

Jay accepts Tori's offer. Before sailing he makes arrangements through Atkinson for communicating while in Tori's country with the United States secret service, by sending out code reports concealed in published tables of scientific research, and for receiving answers from American scientists through the like in a biometric—biologic—journal. Jay wishes to know the results of American experiments on fruit flies with the emanations—if any—from the dust.

V.

AT THE gangplank Jay waited. The officers knew that he was traveling with Count Tori, so they let him hang around. They were all men of Tori's race, as the liner was one of the great fleet of luxurious floating hotels subsidized by their government for the lucrative tourist trade.

Like everything else since the beginning of the Great Prosperity, globe-trotting had experienced a tremendous boom, and the steamships of all countries were sold out months in advance of their sailings.

Jay watched the chattering, gayly dressed crowd of women hanging over the railing of the upper deck and wondered how many of them knew that there was a war on and that they were aboard an enemy transport. Probably none, he concluded. Like Jake, they were too busy flinging the cash to bother about the credit.

How would they all get home again, Jay wondered, if their "dust bonds" should suddenly be depreciated to about zero while they were blithely touring the enemy's territory? They couldn't walk, and flying was out of the question. Perhaps they would stay where they happened to find themselves and, like millions of their dead and forgotten sisters all through military history, become the mothers of a new race.

As none of them showed any inclination to dash back down the gangplank or to jump overboard, Jay decided that they all really were as ignorant as Jake and not merely acting a courageous part to keep up their spirits.

A limousine whirled up with a flourish and stopped. Two officers hastened forward to open the doors. Little Tori, dressed in a frock coat and top hat like an ambassador, stepped out. The obsequious officers all but prostrated themselves. Turning back to the cab,

Tori helped a strikingly beautiful girl of his own race to alight.

Jay's first thought was that Tori had just been married and had not had time to change his clothes before starting for the boat. This was contradicted by the girl's outfit. She was dressed in a spick-and-span American-college-girls' sport costume. Although she was a good six inches taller than Tori, being in fact a very tall woman for her race, there was an indefinable resemblance between her and Tori. Before he could speculate further on her identity, Tori had introduced them.

"Jay, this is my sister, Nara."

Tori pronounced it Nah-rah, and Jay seemed to remember having seen the word in his grammar as the name of some flower. Nara, with her vermilion lips—artistically touched up, of course—her olive and old-ivory skin, and her dark, lustrous eyes, was more exotically beautiful in Jay's opinion than any tropical flower he had ever seen in a hothouse. She held out her slim, gloved hand.

"How do you do, Mr. Jarvis? My brother has told me lots about you and how good you have been to him."

Her English accent was much better than Tori's, although his was very good indeed, and her manner was exactly like that of any well-bred, sophisticated American girl who has traveled much in Europe. Jay instantly sized her up as being the "better man" of the two in every way. She had learned something that Tori would never master. The expression about her eyes and mouth showed that she had been blessed with a gift few of her people share, a saving sense of humor.

Tori, as Jay knew to his own sorrow, was physically, mentally, and morally incapable of understanding a joke or seeing the ludicrous side of anything. Six tiny, almost invisible wrinkles in the strategic places proclaimed Nara as a girl who knew how to laugh.

Jay was just about to say that Tori might have told Nara a lot about him, but that her brother had never even hinted to him of Nara's existence, when he thought better of it. Tori would only be offended. Jay contented himself with an innocent comment:

"I hope your brother didn't tell you the truth."

Nara saw the point and smiled. "Perhaps he didn't. It was all very flattering."

Their hand luggage was carried up the gangplank, and the officer on the bridge began giving his orders through a megaphone. The plank was hauled up, hawsers were thrown off, and the engines began to throb. A din of incoherent farewell messages seemed to quicken the huge vessel into barely perceptible motion, and they had started. Promising to look him up in about half an hour, Tori and his sister hastened off to their staterooms.

Jay's quarters gave him a shock that was not wholly pleasant. Even in prosperous times such as the world was then enjoying, the suite—Jay supposed that was what it was called—would have been luxurious for a multimillionaire.

"What are they trying to do to me?" he muttered to himself as he surveyed the extravagantly furnished sitting room. "Do they take me for the Prince of Wales? What's the idea?"

He tried a door on the left and stopped in astonishment at the threshold when he saw the room beyond. It was a fully equipped laboratory, with crowded bookshelves lining one wall, ready for immediate occupancy.

A hasty inspection of the apparatus and the titles of the books and journals confirmed his guess. He was to be the occupant, and his employers evidently expected him to begin work at once. The books and apparatus were precisely those which three years of almost incessant, grueling work had made as familiar to him as his own hands. Well,

he was ready whenever they gave the word. Why not? They were paying him well enough.

Jay peeled off his coat and vest and reached for the work smock hanging behind the door. Tori should find him busy when he arrived to pay his little call. Jay found the latest number of his favorite technical journal on the long table across the end of the room and settled down to scan the articles in search of anything new in his specialty. There was a timid rap on the door which Jay had not closed.

"Come in!" he called without turning his head.

LIGHT footsteps pattered over the cork floor, and Jay looked up to see a boy, who looked about seventeen, standing deferentially at his side.

"Hello! Who are you? What can I do for you?"

"I am your assistant, Dr. Jarvis," the boy announced with a most engaging smile which showed all his fine teeth. "I am Seventeen."

"Just what I guessed," Jay remarked with satisfaction. "What's your name?"

"Seventeen."

"No, no! Not your age. Your name."

"Seventeen," the boy repeated, favoring Jay with his most entrancing smile.

Jay scratched his nose. "If you don't understand English any better than that, a hell of a lot of use you'll be to me."

The boy's solemn reply almost knocked Jay off his chair.

"I am paid, Dr. Jarvis, to be a hell of a lot of use to you."

"Say, young fellow, where did you pick up English? There's a sort of singsong about your brand, as if you were chanting a hymn."

"I learned English at the missionary college in my native province."

"College? Then how old are you, for Pete's sake?"

"Thirty-two."

"I missed it by only fifteen years—about forty-seven per cent. What is this nonsense about your name being Sweet Seventeen?"

"Not Sweet Seventeen," the boy corrected with the gravity of a plaster image; "just Seventeen. That is my number in the scientific brigade to which I am attached."

"Sounds rather inhuman to me. Also a bit too dramatic. Theatricals are all right in the theater. In a workshop like this they only get us all goose-stepping around as if we thought we were big savants. I shall call you Sam for short. What can you do?"

"Mathematics. All the usual developments of the quantum theory—wave mechanics, including the relativistic form, matrix algebra, the applications of substitution groups, Lie's theory, and so on."

"You must be pretty good. What else can you do?"

Without batting an eye, Sam completed the tale of his impressive accomplishments. Jay noted without surprise that Sam seemed to find nothing incongruous in the list.

"Wash bottles," he said.

"Just the man I need. Count Tori must know me better than I know myself. But just at present I don't need anything in quantum mechanics or bottle washing. Do you speak your own language as well as you do mine?"

"Better," Sam declared.

"Then you can teach me."

"But ours is a very difficult language, Dr. Jarvis."

"I've guessed as much. We shall get up at five, and put in three hours before breakfast. Then we can knock off another three hours after dinner—say from eight to eleven. If you need a nap you can catch one in the afternoon. I'll have plenty of calculations in a day or two to fill in the rest of your time."

Sam's smile faded. "I do not know how to teach."

"Oh, you won't have to teach me much. All I want of your language is enough to know if some girl is insulting me. It's an art, I'm told, among the ladies of your country. Come on; I'll show you how to teach a language."

Jay got up and laid the journal in his hand on a bench. "I get up out of my chair," he said, "and I lay this journal on that bench." He handed Sam the journal. "Now you do it. Sit down, get up, put the journal where I did, and tell me everything you are doing as you do it—in your own language, as idiomatic as you can make it. If I don't follow, I'll ask. And as I repeat after you, catch me up when I don't say it right. Don't stop with what I did, but go on doing any fool thing that comes into your head and keep telling me what you are doing."

Poor Sam was horribly embarrassed, but he could not refuse. Only when Jay started murdering the language did Sam begin to take an interest in his antics and warm to the job of setting Jay straight. As Jay presently discovered that he got on much better if he imitated all of Sam's antics while he was stuttering to describe them, the pair made a highly diverting spectacle when Tori and his sister arrived to pay their call.

They had let themselves in when repeated knocks and rings brought no response and were now standing in the door of the laboratory enjoying the performance. Tori managed to control his face; it was too much for Nara. Her shriek of laughter ended the lesson. Sam scuttled from the room, leaving Jay to explain.

Tori protested that it was not necessary for Jay to learn the language. Most of the men with whom he would be associated could make themselves understood perfectly in English, and those who lacked English spoke German, which Jay had learned as part of his scientific training. Jay laughed it off. With a glance at Nara, he declared that his object in trying to pick up a smattering was purely social.

NARA was frankly modern and cosmopolitan. Pretending to take Jay for a gay young blade, she remarked that English would be sufficient for the sort of social contacts Jay no doubt had in mind, as English and American sailors had taught the girls all that was really necessary.

Jay hotly denied the innuendo. Had he been alone with Nara he might have continued the conversation in a different tone. But he had caught the shadow of extreme distaste that flitted across Tori's face while his sister was speaking, and he thought it only politic to crack down on her rather hard.

Nara was not deceived by Jay's tone, if the mischievous, almost sly glance she stole at her sedate brother meant anything. Nevertheless, she thought it tactful to divert the talk into cooler channels, and they discussed the prospects of the voyage.

Tori nodded his grave approval when Jay declared his intention of putting six hours a day on his scientific work. Jay hoped to have at least a preliminary report of something pretty fair ready by the time the boat docked.

"By the way," he asked, "does that offer of publication in the 'Transactions of the Academy of Sciences' cover preliminary reports?"

"Of course," Tori assured him. "If they are short enough, they are printed with the abstracts of forthcoming papers at the end of an issue."

Jay asked Tori how he would pass the time, as the count cared little for games and perhaps less for mixing.

"Affairs of State, as one might say," Tori confided with an enigmatic smile. "Every hour takes me that much nearer home and work. I shall spend most

of my time not far from the wireless room, I imagine."

"And I," Nara admitted, "shall spend most of mine in the ballroom. The rest will go in sleeping off one party and getting ready for the next. Without a little innocent flirtation now and then, long ocean voyages are insufferable."

Again Jay caught that shadow of distaste in Tori's face. Evidently he did not entirely approve of his sophisticated sister. Jay suspected her of tormenting her sober-minded brother deliberately. They were elusively alike in many ways, and yet singularly unlike in temperament.

Nara suddenly remembered that she must consult her maid about what gown to wear at dinner that evening. It was a serious business this, she declared, of choosing the gown for her first appearance in the saloon. One mistake—say silver and blue instead of scarlet and black—and the voyage would be ruined. The American women would run off with all the prizes. Blowing her brother a kiss—a trick she had picked up watching sentimental English plays—she slipped out and left them together.

Tori's brooding face was both sad and angry. Jay studied him in silence. Once or twice Tori seemed on the point of speaking, but reconsidered and said nothing.

"Anything up?" Jay asked sympathetically.

Tori sighed heavily. "As we shall probably see a lot of one another, I may as well tell you now. Sooner or later you would hear it from some one else. Nara is only my half sister. We had the same mother."

"I noticed that she is rather taller than you."

"Yes. Her father was a very tall man. He was an ensign in the American navy when Nara was born."

"Oh!"

"Now he is an admiral."

For the first time that he could remember, Jay's ready tongue failed him. It flashed across his mind that Tori might not unreasonably harbor a violent dislike for Americans, and he seemed to hear Senator Atkinson cautioning him: "Watch your friend." He kept perfectly still, wondering whether Tori would share any further confidences. He did.

"I saw him the other day."

"The admiral?"

"Yes. He did not recognize me, of course, as I was only a little boy—four or five—when he visited our country. I found him very intelligent. We talked of world peace and the League of Nations. Our elder statesmen had asked me to interview him before returning home."

TORI spoke impersonally, as if he were discussing a scientific problem. There was no irony in his allusions to the admiral's intelligence and world peace. Jay gathered courage to ask a plain question:

"Did your sister see the admiral?"

"Of course! She always drops in to see him on her way to or from Europe —when he is ashore. This time he told her she was very beautiful. Perhaps she is. I cannot say."

"She would attract attention in any crowd."

"And she is always in the center of a crowd."

Jay decided to plunge and get at the facts: "You don't seem to think much of your sister."

"How could I? She is not truly of our people." He gave Jay a straight look. "She will marry an American or an Englishman. She has no use for our own men. Still, I am very fond of Nara."

"By the way," Jay inquired coolly, "since we are having a pretty straight talk about your affairs, does the admiral

acknowledge your sister as his daughter?"

"Why should he? What could be gained? His own family would only suffer, and Nara would not be helped. As no member of his family, except himself, seems to care for our part of the world, they are not likely to learn the truth."

Tori smiled to himself. "Once there was an amusing scene. Nara had called to see her father at his office on her way home from school in England. She intended to surprise him, so she had not written—through a trustworthy third person, of course—as usual. The admiral was surprised. While he and Nara were talking, his youngest daughter walked in unannounced. The girl took a great fancy to my sister and begged her to visit the family for a few days. Nara explained that she had to get home at once to see to her affairs."

"Quite awkward for the admiral, I should say." Jay studied Tori's face before putting his next question: "Why do you disapprove of your sister? Nothing that has happened is her fault."

"Of course not," Tori agreed emphatically. "Our people think almost nothing of such temporary unions. Nara's mother was a widow when Nara was born. Your people," he went on, with a touch of disdain, "attach altogether too much importance to that side of life. We consider it natural and think no more about it. Why be morbid about the facts of nature?"

"All a matter of geography. At least that used to be the popular theory. I'm like you. The customs of a country are its own affair. But if you are so philosophical about that part of it, why can't you accept your sister for what she is and let her live as her heredity urges her to live?"

Tori made a sour grimace. "Because I can't. That is all."

"Her social life sets your teeth on edge?"

"Not at all! That is of no importance. And," he continued with bitter emphasis, "it is of even less importance to her than it is to me. She rather despises it, I believe."

"Then what's the matter?"

Tori's eyes flashed and his nostrils trembled. Jay had never before seen such a display of suppressed emotion from the habitually self-possessed little man.

"I hate her ambitions!"

"What are they?" Jay demanded calmly.

"She is a leader in the movement toward internationalism. Think of it! My sister, with the blood of one of the oldest and most patriotic aristocracies of the world in her veins, using all her talents—she is gifted—to destroy the very thing that has preserved our people as a nation for centuries. She would destroy it all by diluting our national character with foreign ideals alien to the genius of our people. If her ambitions and those of her friends in America and Europe triumph, we shall cease to exist as a nation."

Jay fancied he detected the professional orator and budding statesman behind Tori's phrases, but for all that he was forced to admit that the little man seemed genuinely moved, and, therefore, probably speaking at least part of the truth.

"What can one lone girl do against the traditions of a great nation like yours?"

"Do? What has she done? When you learn enough of our language to read the newspapers in the vernacular—the red rags read by the proletariat—you will see her name on every page. Do you know where she has been for the past eighteen months?"

Jay shook his head. "I've been too busy at other things to pay much attention to what is going on."

"She has been touring Europe as the

official delegate of the Youth Congress of our country to the conventions of similar congresses of deluded boys and girls, from Moscow to London, and from Stockholm to Rome, preaching the illusory dogmas of pacifism and internationalism."

Tori was breathless with disgust and indignation.

"What's wrong with that?" Jay demanded. "Isn't peace more sensible than war? And how the devil do you expect your country—or any other—to exist? By eating its own smoke? You'll soon starve to death that way and——"

Tori curtly interrupted: "Do you believe it is possible to convert the nations of the world to internationalism and their peoples to pacifism?"

"If I did not," Jay retorted, "I should hire some one as charming as your sister is, and as persuasive as she must be according to your account, to do exactly what she is doing."

Tori gave him a searching glance, and Jay wished he had not let his logic run away with his caution.

"You believe Nara is no better than a subtle sort of spy or *agente provocateuse* to lull our competitors into dreams of a false security? That she has no integrity?"

"Not at all," Jay replied. "For two reasons: First, I know nothing of your sister except what you have told me; and second, I am still young enough and green enough to believe that it *is* possible to make the human race use its common sense and give up war and other brands of damn foolishness.

"You've known me for three years. Did I ever strike you as the sort of guy who would join every mushy movement that comes along and go flocking to inspirational talk-fests? I base my theory on what seems to be a scientific fact—we may all be half crazy, but most of us are not incurable."

"I see little evidence of it," Tori remarked dispassionately. "Do you think we shall ever have another world war?"

"Another? No."

Again Tori seemed to be reading his mind, and Jay silently cursed his own outspokenness. Did Tori guess that Jay fully expected, or at least hoped, that the invisible war then going on would be the last? He must learn to control his convictions and not let Tori or his friends goad him into another argument. Tori got up to go.

"Well, whatever may be true, we need not get excited. These questions will not be settled by you or me, or in our generation. In fact, I doubt whether they will ever be settled. I have my work to do, and you have yours. That is the most we can say. By the way, if you want anything, either for your work or your personal comfort, please let me know."

"Thanks, Tori, I shall."

"You will dine with Nara and me?"

"My tongue has been hanging out for an invitation for the last two hours."

Tori bowed one of his stiff, ceremonial little jerks and departed.

WHILE he dressed for dinner, Jay speculated just how much of Tori's broadmindedness in the awkward matter of his sister's parentage was window dressing and how much whole cloth. Jay rather suspected Tori of being less platonic toward the admiral than he pretended. In fact, he was inclined to size up the whole episode of Tori's brotherly frankness as a rather transparent trick to delude him—Jay—into believing that Tori had nothing but the sincerest admiration for all Americans or, if not exactly that, then merely a passive indifference, when Jay should hear from gossipy third persons the romantic but not uncommon story of Nara's parentage.

Jay could have kicked the admiral—or rather the ensign—for a thoughtless imbecile to get his whole country into

a mess over the sowing of his private wild oats. Then he reflected that the ensign could not possibly have foreseen that the little boy Tori of four or five had the makings in him of an extremely dangerous enemy.

"It's easy enough for Senator Atkinson to warn me to watch Tori," he muttered. "But who the devil is going to watch me while I'm doing it? Tori seems to have eyes in the back of his head."

The obsequiously smiling Sam—or "Seventeen"—appeared.

"Do you need any assistance, Dr. Jarvis?"

"No. Get to blazes out of here and don't show up again till five to-morrow morning to give me my lesson. I hate being waited on."

VI.

ALL but the last thirty-six hours of the voyage lay behind them. To give the bored tourists a thrill, the floating hotel was proceeding at half speed through the dangerous channel between two of the "dust" islands. These had recently been purchased from the decadent powers which had owned them for nearly four centuries.

Far in the hazy distance loomed the densely forested mountain ranges whose swift streams provided the necessary energy to operate the electrical plants of the dust industry; and precipitous cliffs of volcanic rock, hemming the narrow valleys gashed from the mountains to the sea, furnished an abundant supply of the basic raw material.

This much of the process for manufacturing the dust being no secret, the directors of the tourist trade were generously permitted to give their patrons a full and unobstructed view of the operations—from the water only, of course. Landing was prohibited. And to make sure that no slip should occur, two heavily armed cruisers escorted the steamer through the channel.

The tourists for the most part soon tired of the spectacle of basalt cliffs cascading down in shattered rubble as high explosives did their work. A few, more inquisitive than the dancing, tennis-playing, drinking, bridge-playing, and flirting majority, showed a mild interest in the proceedings.

What did the workers do next to all that broken rock when they had it? The polite stewards and deck officers replied that they did not know; the further details of the manufacture of the fertilizing dust were matters for the technical workers and government scientists alone. Did they always have to use volcanic rock? The officers smiled. No; as the tourists should see for themselves as they passed other islands, any kind of rock would do. Even sand was being used in prodigious quantities.

Then why, engineers demanded, did not the manufacturers use supplies nearer home? Surely sand and rock were not scarcities? The answer to this question was obvious, the officers politely pointed out. The islands actually being used were practically worthless for agriculture, and indeed scores of the smaller ones had not been inhabited for over a century. To have scooped up or blasted the basic materials nearer home would have ruined rich agricultural land, densely populated, or have interfered with the fishing industry by irreparably damaging the beaches, bays, and channels.

"We shall pass one of the experimental farms in about an hour," an officer promised. "Then you may see where they test the dust before shipment."

A rubicund tourist in plus-fours and a yachting cap yawned. He turned to the platinum blonde at his side. "Let's find the others and get in some bridge before dinner." They strolled lazily away, missing the rest of the officer's promises.

"To-night we pass the largest establishment in this sector where they convert the rock into dust. If you stay up till eleven, you will see it from the deck. If there is no fog," he added.

One by one his audience drifted away to the bar or the bridge tables, and the officer found himself alone. A fellow officer sauntered over from the rail and joined him. They exchanged a few remarks in their own language and parted, laughing mirthlessly, to go about their duties.

FORTY MINUTES later Jay emerged from his quarters to get a mouthful of salt air. He had been hard at work since eight o'clock the preceding evening, and his eyes lay like cinders on his brain. Hoping to finish his preliminary report before landing, he had skipped his language lesson with Sam, putting all his effort on his science.

Sam, at the moment, was lying on his back with his mouth open, snoring off the effects of a protracted debauch of mathematical calculations. As Jay had promised, he soon found plenty for his assistant to do. What Sam lacked in a sense of humor he more than made up in technical proficiency.

To try him out at first, Jay had given him a rather routine piece of drudgery to do, which Sam raced through like a streak in about a fifth of the time Jay had anticipated. Somewhat startled, Jay turned him loose on a real problem in the perturbation theory which he did not feel like tackling himself. It was the complete and successful solution of this complicated puzzle which had exhausted poor Sam.

Although Jay had another tough brute ready and waiting for Sam's patient skill, he considerately let his assistant have his nap out.

Tori had evidently spied Jay from the wireless room. He now emerged and joined his friend by the rail.

"You look tired," he remarked, laying a hand on Jay's arm. "Why don't you go and lie down? There is no desperate hurry in fundamental science like yours. Industry will not catch up with you for fifty years—or more."

"But some bright boy in Germany or England—to say nothing of the good old U. S. A.—may beat me to what I'm trying to do next week."

"Would that matter?" Tori asked, with just the faintest inflection of scorn.

"Not if I were as impersonal and as unselfishly unambitious as you fellows are. But, as I told you once before, I'm still uncivilized enough to prize my personal scientific reputation. It means something to me whether I get the credit for my work. By the way," he asked as if by an afterthought, "when does the next issue of the 'Transactions of the Academy' go to press?"

Tori considered for a moment. "I am not sure," he began doubtfully, "but I think the last copy for the next issue went to press yesterday. If not, it must have been the day before. Yes," he added decisively; "it must have been yesterday. I remember the publication schedule now."

"Then I shall have to wait four weeks before getting my preliminary report into print. Darn it all! I shall as likely as not be scooped."

Tori reassured him. "If you will give the operator your report, he can wireless it directly to the printers and catch the presses in time."

Jay looked depressed. "The report is not quite ready. Sam will have to check over some of the details with me before I dare to shoot."

"How long would it take?" Tori asked.

"A couple of days at the least. Four or five at the outside."

"I am afraid we could not hold the presses that long. You see, the 'Transactions' must be off the presses in time to catch the next mail steamer."

"Of course! I guess I shall have to let it go. My stuff may not be so important as I think it is. Didn't you get that way over your own work? Just after you finished a particular job, you thought you had the world by the tail. Then, when you had sobered up a bit, you found yourself squeezing a dead fish."

"I know the sensation," Tori admitted ruefully. "Only I seldom confused my fish tails with the world's. I knew what they were the moment I got my hands on them. As I told you, my scientific work is trivial beside yours."

Tori became friendly and sympathetic. "If your personal reputation really does mean as much to you as you try to think it does, I hope nobody anticipates your latest. Now you had better go and take a nap. You will want to see the manufacturing plant when we pass it to-night—at about eleven. It is worth seeing."

Jay nodded and turned toward his quarters. He had gone but a few steps when Tori called him back.

"Oh, I quite forgot what I came out to tell you. The operator gave me a message for you." He fumbled in his pocket and found a bulky green-and-white envelope.

Jay recognized the offering as a radiogram.

"I hope it is not bad news from home," Tori remarked as Jay tore the envelope.

"Not likely," Jay surmised. "My family is too hard up to squander money on a young newspaper like this."

Fully conscious that Tori was watching him through narrowed lids, Jay slowly read the unnecessarily detailed message through twice. His second reading strengthened the impression left by the first—the code experts of the navy imagined they had solved their problem and were now communicating with him.

Not only had they devised a way of getting any results the biologists Davisson, MacMillan, and Spier might find through to Jay the very hour the results were obtained, but they had also invented an equally simple way for Jay to get his own discoveries to the proper quarter within an hour or two of making them. At least they evidently thought they had done all this.

THAT THE naval experts had inspired the radiogram was pretty obvious from its nature. Boiled down, the message was simply an appeal to Jay from the editor of the journal which had printed his two-page, prize-winning Ph. D. dissertation to continue publishing his work in the same journal.

The editorial staff recognized, of course, that Jay's employers would have the right to publish the work in its full, completed form, as rapidly as Jay could get it out from month to month, but, for the honor of American science, the editor begged Jay to wireless him at least a summary of the results and tables of numerical data for publication in the American journal. The editor would promise not to print anything until receiving word from Jay that the "Transactions" published by Jay's employers were already off the press. If necessary, he would hold Jay's articles till any issue of the "Transactions" containing them had reached American libraries.

But, to repeat, the honor of American science demanded that Jay consider what was due to his fellow workers in America and, conversely, Jay's fellow workers should not let Jay cut loose from America entirely. All in all the whole matter was put on a very lofty plane.

To make sure that no misprints in the all-important numerical data crept in, the editor would have Jay's communications monotyped the day they arrived, and would wireless the proofs—the outcome of the monotyping—di-

rectly from the first printed sheet pulled from the machine and not from Jay's radiogram.

Atkinson had said Jay would recognize any message, should the naval-code experts succeed in getting one through. They had slipped one into Jay's hand right under the enemy's nose. Not only that, they had lifted Jay's simple code device from the slow pages of scientific periodicals, transforming it into a regular wireless service as expeditious as the fastest commercial or military wireless service in the world. They added—through the editor, of course—that arrangements would be made whereby Jay could pay the costs at his end by credits to be taken up in America once a month by some representative of Jay's employers.

Jay presumed that the biologists would use the code he had given them on the wireless "proofs" of his own numerical data. If they used, instead of Jay's code, another, one or two trials would soon reveal the fact, as he had—fortunately—provided "signatures" for both himself and the biologists. He felt that he could carry on quite a conversation, if necessary, without rousing the suspicion of even the shrewdest enemy spy.

The naval experts had done a good job. They seemed to have thought of everything, including the matter of finances. Jay felt like taking his hat off—he did not have one on at the time—to the intelligence department of the navy. He was to realize in a moment that they had thought of everything but the one thing of first-rate importance. They had overlooked the simple fact that Jay and Tori were on the same boat at the same time. Their oversight was a blunder of the first magnitude—or so it seemed to Jay at the moment when Tori handed back the radiogram after carefully reading it—or pretending to read it. Jay expected a perfunctory approval.

"I am afraid it is impossible," Tori regretted.

"But wasn't I to be allowed to publish my work how, when, and where I chose?" Jay reminded him.

"Of course. But this amounts to giving the Americans precedence over ourselves?"

"How so?"

"They would be in possession of your results before our own men saw them in our 'Transactions.' It would be a slight to our academy."

"Then why couldn't I publish in the American journal exclusively, and not use your 'Transactions' at all?"

"That would be unobjectionable."

"Thanks; I think I shall."

"We shall be glad to send your communications by wireless, as the editor suggests. And we insist upon paying all costs ourselves."

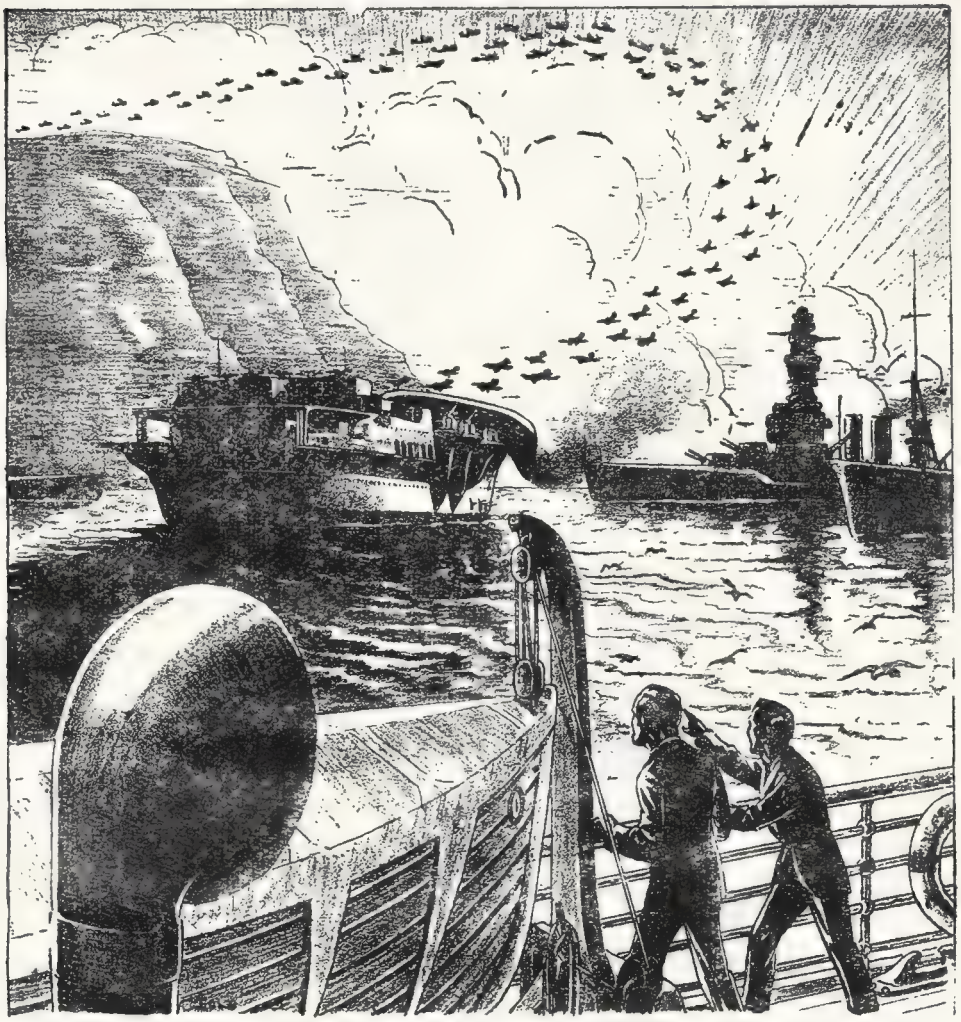
"But that wouldn't be fair," Jay protested.

"It would be the only fair thing," Tori disagreed firmly. "As you have agreed to work in our laboratories, it is no more than right that we relieve you of the burden of publishing your work and seeing it through the press. Please say no more about it."

"Thanks, Tori. You treat me far too generously. And just to show you that I'm not the selfish, overambitious pig you must think me, I shall publish all my stuff in your 'Transactions' exclusively."

"I knew you would!" Tori smiled. "Because I know you better than you know yourself, Jay."

"You flatter me." He laughed, convinced that Tori had studied the radiogram carefully before delivering it. If Tori did not suspect Jay of having a code up his sleeve, he had played his game with the subconscious mastery of genius. All the tricks were Tori's, and Jay wondered whether even his laboriously fabricated scheme for using the "Transactions" as a medium for secret



A compact swarm suddenly appeared over the mountain range. Within fifteen minutes the last of the planes had landed on the deck of the carrier.

messages was any longer as spyproof as he had fondly imagined it to be.

"Well, I'll put in another hour or two before taking a nap. Hello! Why all the battleships?"

FOUR SQUAT, ugly gray brutes came into view as the steamer rounded a headland. A fifth monster, with the vast flat deck of an airplane carrier brooding over its bellying hull, sat in the waters of the channel a mile or so inshore from the sentinel battleships. Altogether the five did not make a very pretty picture.

Tori quietly answered Jay's question: "To repel attack."

"Attack on what?"

"The carrier."

"I don't see any prospect of an attack. What's it all about, anyway?"

Tori explained briefly. The carrier transported the dusting planes, already expertly "charged," from the great cen-

tral experimental laboratories. Improvements in the dust were being constantly sought by the scientists in the central laboratories. Before putting a particular improvement on the market, it was thoroughly tested out on the experimental farm the steamer was then passing.

To prevent theft or interference by unfriendly or hostile nations, the plane carrier was convoyed by four Class-A battleships to and from the farm. Should the battleships get the worst of an engagement, they would turn their guns on the carrier and sink it before they themselves were sunk.

In the experimental stage of possible improvements, Tori explained, it would be comparatively easy for foreign experts to discover the secret of the dust; the perfected, commercial forms on the market alone could be safely sent abroad. Hence the battleships.

"We shall pass one of the factories where our latest improved dust is being manufactured for shipment this season, at about eleven to-night. If you are still up, it may interest you to see it in passing."

"I shall tell Sam to rout me out. Here come the planes."

A compact swarm suddenly appeared over a distant mountain range. Within fifteen minutes, to the gaping wonder of the tourists, the last of the planes had landed on the deck of the carrier.

"Come up to the bridge," Tori said, "and I'll see if I can show you something of the experimental farm."

On the bridge a polite officer instructed Jay where to look through the powerful binoculars. At last Jay found what Tori wished him to see, a broad table-land at the base of the mountains sloping gently toward the channel.

"That is only one field," Tori explained. "They dusted that one about six months ago. The planes that just came in have been dusting behind the range, on an open plateau."

"Quite a field," Jay remarked, studying the curiously patterned surface of the table-land through the glasses. "There must be several hundred square miles of it."

Tori offered no remark as Jay continued to explore the sinister pattern with his eyes. Without the glasses the table-land appeared merely as a broad slope of uniform greenish-blue. Seen in detail through the powerful binoculars, the table-land shone out as a mosaic of many colors.

Patches of brilliant orange appeared with startling distinctness in the midst of dark-green expanses which, somehow, were strangely reminiscent of the rank cornfields Jay had viewed with Jake from the train; and blotches of angry red, like the decay of certain kinds of poisonous fungi, alternated with violent blues, dull mauves, and sultry purples, like the corruption of a mass of decomposing fish.

Many of these patches were many square miles in extent; others glowed in greater intensity over an acre or two. A few isolated spots of clear lemon-yellow were probably not more than fifty or a hundred square yards in extent.

Jay handed back the glasses. Once more the softening influences of distance and atmosphere smoothed out the evil mosaic in a unform greenish-blue.

"That was one of our failures," Tori remarked.

Jay silently wondered which particular color recorded the failure. Was it the green of rank vegetation or the sultry red of slow decay?

"It looked like a bad case of mange or something worse to me," he remarked. "Have you had many failures with the dust?"

"Not with the dust itself. The improvements cause us all the difficulties."

"Then why bother with them? Isn't the dust good enough as it is?"

"Temporarily, yes. We are striving

for a dust whose effect will be permanent—or practically permanent."

"Instead of one application every year or two, one application about once a century?"

"That is the goal we have set ourselves," Tori answered with grave solemnity. "Perfection, or the closest approximation to it that is humanly possible, is our ideal. In this as in other fields of our national endeavor, we are urged on by the spirit of the craftsman. The painstaking genius of our people is satisfied with nothing less than perfection in the minutest details. Commercial success is secondary."

"That's all very well," Jay objected, "but while you are puttering over details that can only be seen with a magnifying glass, you'll produce a total effect like a chromo that nobody will buy. What are you going to do when the whole blooming world has dusted itself for a century or two and isn't buying any more of your stuff?"

"Then the world will enter its new golden age."

"Like hell it will! Some smart guy will come along and corner all the potatoes, or corn, or oranges, or wheat, and we shall be hungrier than ever." He pointed to the battleships. "Going to dust those, too, and make twenty sprout where only one sprouted before?"

Tori's reply was lost. Nara appeared on the bridge, trailed by half a dozen men, ranging from about twenty-eight to eighty-two, to arrange the details of the party she planned for that evening with her brother. Lightly dismissing her admirers, she drew Jay and Tori aside.

"Suppose just we three come up here this evening after dinner and watch the glow?"

"The glow?" Jay repeated.

"Oh, I've given it away. But it is really very beautiful, and you must take it in quietly, away from that awful chattering mob of nonentities."

"Tired of them so soon?" Tori asked, with half a sneer.

Nara ignored her brother's slur. She addressed Jay.

"You will come, won't you?"

"Won't the captain have something to say about our making free of his bridge?"

"He's a good sort. I'll speak to him—he always lets me do as I please. You'll come?"

"Sure!"

Tori expressed his regret—to Jay—that he would be unable to join them. The wireless room would claim all of his attention.

VII.

WITH SAM'S solicitous assistance, Jay had prepared a delightful surprise for Nara. He sprung it on her just as they were about to climb up to the bridge. Speaking with meticulous deliberation, Jay paid her a flowery compliment in her mother's language. Nara gasped and gave him a startled look. Then she leaned against the wall and abandoned herself to unrestrained laughter.

"Good Heaven," Jay exclaimed, "what did I say?"

"Never mind," she returned. "You spell what you meant to say with an 'n' instead of an 'r.' Thanks, just the same. Now I'll give you one."

She reeled off a rapid phrase, not a single word of which Jay understood, and tripped lightly up the stairs. Following slowly, Jay resolved to stick to English in his future conversations with her until Sam pronounced him letter perfect.

Poor Sam had tried to dissuade him from the rash project, but Jay, with his youthful self-confidence, told him to shut up; he knew what he wanted to say. He wished he could remember the sound of what Nara had just said, but it had already slipped out of his mind.

Two comfortable chairs had been placed for them in the darkest corner of the bridge. As they settled down, the officer on duty did not even turn his head, although he must have heard them coming up the stairs. All through their long exchange of confidences, the man maintained the same rigid courtesy, never once giving the slightest hint that he was aware of their presence. But they found it only natural to lower their voices and talk in a subdued undertone. Jay was thankful more than once that the wireless room and a Spartan sense of duty had deprived them of the pleasure of Tori's company.

From flirtatious badinage their talk gradually drifted—under Nara's adroit piloting—into less personal channels. Jay was not asleep. The alluring girl at his side had caused many a man twice or three times Jay's age to lose what head he had. But Jay felt that he could not afford to lose his own till his work was done.

Was she pumping him, presumably at her brother's suggestion, or was she nothing more than what she seemed to be—a somewhat bewildered girl trying to understand one of the riddles of her life? Jay met her frank confidences with equal frankness. Truth, he had heard, was the surest of all ruses for confounding the untruthful. So Jay told Nara what he imagined was the truth and let her make of it whatever she chose.

"Do you understand my brother?" she whispered.

"Perfectly! I did not until the last day we were together at the university —when he offered me this job. Before that I had not seen what he really is."

"What is he?" she breathed.

"A fanatic."

"A fanatic? Aren't you rather hard on him?"

"I don't think so. Of course, an American like me can never get at the inside of any man of your race. But, barring that, I think it is pretty plain that your brother has a fixed idea on everything pertaining to the honor and greatness of your country."

"It isn't my country."

"I beg your pardon. Of course not! Only I didn't know how you would feel about it, so I put it that way."

"I have no country," she continued. "Socially, if I cared about such things, I should be an outcast. It is so!" she exclaimed hastily, as Jay started to express a polite dissent. "But I don't care about them. Didn't St. Paul advise us to be all things to all men? At least I seem to remember something of the sort in my early lessons at one of your missionary schools where they taught me English. It sounded like good advice to me, and that is exactly what I try to do."

"You don't look like a cynic," Jay remarked skeptically. "Do you expect me to believe that?"

"You don't understand. Being neither one thing nor the other nationally, I care nothing about national honor or race pride, or any of those poor futile things my brother prizes. I never even see them because I see all around them. It is enough for me that I am a human being—one of nearly two thousand millions."

"So that is why you pull for internationalism. Now, don't get sore if I ask a very personal question, because I don't mean it personally at all. Isn't all your running around organizing peace and international-good-will societies just part of your general campaign of devilment to get even with your brother for riding you all the time?"

Nara considered. "No," she replied. "It cannot be that, because my brother was my greatest friend till I began to grow up and act for myself. He was always patient with my wild ideas. It is only in the last three or four years that he has grown to dislike me. When

he saw that he could not change my opinions and make me a reactionary like himself—he comes from one of the three oldest families of his country—he was hurt.

"He could not believe at first that the medieval traditions of his people and his own narrow nationalism meant nothing to me. When he saw that he could not influence my feelings, he began to persecute me. Not brutally, of course, but in countless petty, humiliating ways. The only revenge that I have ever taken—my devilment, I suppose you would call it—has been to see that a string of Americans and Europeans is always traipsing after me."

"They traipse," Jay agreed; "if the specimens on this boat are a fair sample. If I weren't so confounded busy working for your brother, I should have joined the string myself."

"You would be different," she said as softly as if she had sighed.

"Don't kid me."

"I know." And as if to prove her knowledge, her hand stole into Jay's.

JAY felt like a perfect fool. What should he do? If he told her—not in words, of course—to keep her hands to herself, she would rag the life out of him for being his mother's good little boy. And if he did what she evidently expected of him, she would know that she could kid him whenever she chose.

"Now I know you're kidding me," he said coolly.

Nara laughed, but did not withdraw her hand, and Jay let the matter ride. After a sufficient interval Nara resumed the conversation:

"Why did you help my brother at the university?"

"Partly out of spite. Partly because he and I got on well together."

Nara's hand registered her surprise. "Out of spite? But why?"

"All the fellows in my crowd were so damned snobbish and two-hundred-per-cent patriotic that they gave me a pain. Your brother and I were thrown with them eighteen hours a day. The whole bunch of us had to live in the graduate-science dormitory the first year. We all took several courses together. They wouldn't speak to your brother when they met him in the halls or ran into him in the lounge.

"Their families weren't so old as your brother's, but you would have thought their mothers and fathers had been born on the poop of Noah's Ark. Your brother's skin was the wrong color. At meals they were all deaf. They never heard when your brother asked them to pass the salt, or the bread, or the water. It got under my skin. My own family—I'm not bragging—was as old as any of theirs. And until this crazy dust began smothering us we were stinking rich—pardon my language, but that is the good American for what we were. Don't you see what a temptation it was? I fell, and then I found out what a swell guy your brother is."

"Was, you mean."

"I suppose you are right. Still, I like him as well as I ever did—when he isn't charging about on his own high nationalistic horse. Then I want to kick him."

"Some day you will be a good internationalist," she promised. "Just like me. Shall I convert you?"

"Go ahead and try."

"It won't be difficult. Your snobbish friends at the university did all the hard work for me. They ripened you, and now I have only to shake the tree. But before I do, I shall tell you why you accepted my brother's offer to join his scientific staff."

"I didn't know it was his," Jay interrupted. "From what he said, I inferred that he was just using his pull as a count to get me taken on."

"My brother is the administrative head of the scientific division of the dust industry."

"He never told me that."

"Perhaps it was not necessary."

"Perhaps not," Jay admitted doubtfully. "If he holds such a responsible position, what was he doing fooling around for three years as a graduate student in an American university?"

"I am coming to that presently. First, I shall tell you why you joined my brother's scientific staff." She paused, and Jay waited, tensely expectant. "For revenge," she said, withdrawing her hand from his.

Jay laughed shortly. "You may be beautiful, and you may be a wiz at organizing the world for peace and good will, but, take it from me, you are as crazy as a bat."

"You know I am not."

"Then where do you get this crazy idea about revenge?"

"Isn't it obvious? Your old and rich family has been ruined by the industry which my brother helps to direct."

"Well, what of it? Isn't business merely business? Neither my father nor I bear any grudge against a successful competitor who happens to have more brains than we can muster. Revenge? Rot! How would I take it?"

"By learning the secret of the dust."

JAY WENT COLD. They were onto him, and Tori had set his beautiful sister to trap him.

"Your imagination works faster than mine. Didn't your brother ever tell you how impractical my work is? I'm in pure science—millions of miles from industry or any other practical application. Just before your brother offered me a job he rubbed it in how worthless—from the dollars-and-cents angle—my work really is. Why," Jay laughed, "he even said it was fundamental."

"That is just what he told me," Nara returned quietly. "I have found out all I could about you from him."

"Why?" Jay demanded bluntly.

"Because I like you."

Jay confidently expected to feel her warm, firm hand stealing into his own again. He was disappointed. He did not take the initiative, but coolly folded his arms.

"Is that your line with all the Americans you string along?"

"No. They prefer something they imagine is more subtle."

"You are far too subtle for me, young lady. Let's talk about something else. You haven't told me how your brother came to be hanging about an American graduate school for three years."

"You saw those battleships we passed this afternoon?"

"Of course! They were ugly enough."

"Hideous, brutal, monstrous!" she burst out passionately. "How I hate them and everything behind them!"

"You seem to mean it. But what have they got to do with your brother's passion for graduate work?"

"Everything! They are symbol of what he believes in. I saw you and him on the bridge this afternoon. You were looking through the glasses at one of the experimental fields. What did you think of its appearance?"

"Not much. As I told your brother, it looked to me like a bad case of mange."

"And did he tell you it was one of his failures?"

"Not exactly. As I recall what he said, it was not his special failure, but one of the failures of the scientific staff."

"My brother directs the staff," Nara reminded him. "All its failures he takes upon himself. It was a failure like that one that drove him to America."

"They fired him?"

"Of course not! Only one man has the power to discharge my brother. He went to America because he considered it his duty to go—he is always doing

something he dislikes because he considers it his duty. The scientific staff failed because they could not quite make a fundamental discovery they had felt confident of making when they started manufacturing the dust for export.

"My brother has told me your opinion of his work. At one of his national universities he had made a brilliant record. They thought he was the man to discover what the staff had to know in order to proceed with their program. For nearly two years my brother worked like a slave to make the fundamental discovery. He failed. Thinking over what he had done, he convinced himself that he lacked the scientific ability ever to succeed. So he went to America."

"Why? I don't see the connection."

"Don't you? He went to America to persuade you to make the fundamental discovery for him."

Jay greeted this disclosure with a roar of laughter which startled the officer on the bridge and momentarily caused him to forget his wooden discretion.

"Now I know you're kidding me. Why, I hadn't even thought of going into physical chemistry when your brother arrived at the university. Old Hildebrandt was stuffing me with the chemistry of soils, because that was what I thought then was to be my work for life. You'll have to do better than that, Nara."

SHE WAS patient—or else extremely clever; Jay could not decide which at the moment.

"I hardly expected you to take what I said literally. My brother had never heard of you. Although," she added thoughtfully, "he knew that your father was making a game but losing fight against the dust monopoly. No; my brother went to your university because his former professor told him it was the best place in the world for him to find what he was looking for."

"And what was that?" Jay demanded facetiously. "The lost chord?"

"I am not kidding you," she retorted with a touch of impatience. "My brother was advised to approach one of the professors and offer him his own price to join my brother's scientific staff. You know who I mean. He supervised your dissertation, I have been told."

"Fatty Perkins? Your brother asked Fatty to throw up his job and go out in the wilderness to break rock? What did Fatty say?"

Nara laughed softly. "Professor Perkins told my brother to go chase himself to hell. He said the United States was good enough for him, even if he was slowly starving to death."

"Just like Fatty. That part sounds like history. Fatty was always grousing because he thought they didn't pay enough. So your brother got turned down! What did he do next?"

"Professor Perkins apologized for his rudeness and begged my brother to make himself at home in the laboratory. So he began working again, hoping to make the discovery his staff needed. Professor Perkins helped him—my brother is deeply grateful, even if he failed again. Then he discovered you."

"Did they give him the Nobel prize?" Jay inquired innocently.

"Please be serious," she begged. "We may not have another chance to talk things out quietly and sensibly."

"All right. Your brother discovered me. What next?"

"He cabled home all about you, and was authorized—by the highest authority—to engage you at any cost."

"Gosh, if I had only known! But go on."

"You were a better man than Perkins, my brother said, and you were working toward the fundamental discovery demanded by the staff. In a year or two, or possibly less, he predicted your work would give them what they wanted."

"When was this?"

"About a year ago."

"Have I found what they want?"

"No. But you will. At least that is what my brother has told his master."

"Shall I know when I find it?"

"I think you will," she answered quietly. "You know what you are doing, and why."

"Don't flatter me, Nara. Right now I'm up a tree and caught in the fork."

"Let me help you down," she begged softly. "I am your friend."

"All right. Here goes: First, how do you know all this you have been telling me? Did your brother tell you?"

"He tell me? I would be the last person on earth he would discuss his policies with. He hates everything I stand for. Sometimes I think he hates me, too."

"You're wrong there, Nara. You are still his kid sister, even if he does hate your ambitions. In fact, he told me so himself. But you haven't answered my question. Who told you all that fairy tale?"

"It was no fairy tale. It was told me by our own agents."

"Your own agents? Who are they?"

"If the other side—the side that owns the battleships and stirs up hatred and strife between nations—has its spies, why shouldn't my side have spies, too? Not all those who work in the laboratories and the stone pits are on the other side. Many of them, especially in the higher positions on the scientific staff, are on our side. Some of them even think my brother a fanatic, as you do. I try to think he is just a little boy who hasn't grown up yet, playing with pasteboard armor and a wooden sword. His mind is in the Middle Ages.

"And that makes it terrible, because he has the power to play with death and destruction the men in armor never dreamed of. Even his master is sometimes afraid of him. But he dare not reprove him, or hold him in check, because the continued prosperity of the nation depends upon a continuance of the dust monopoly. If that is broken, so is the nation."

"But what has the dust monopoly to do with war? I don't see it."

"Nor do I. All I have to go on is what our friends on the scientific staff hint."

"And what is that?"

"Indescribable disaster."

"When?"

"Whenever some one puts the fundamental discovery the nationalistic members of the scientific staff are looking for into their hands."

"What if I should do it? Accidentally, of course, because I haven't an idea what it's all about."

"You must not," she whispered.

"ALL RIGHT. For the sake of the argument, let us grant that I stumble across what they want. Suppose I do this and realize what I've got. Then I suppress it. What good would that do? In a week, or a month, or at most ten years, some other man would rediscover what I had tried to bury.

"Haven't your friends on the scientific staff told you how science is made? Scientific workers are not magicians, each with his own secret bag of tricks. They are like any other modern workers. All use the same tools and all work with the same material. The only distinction between competent workers is that some are quicker and more expert than others—except of course an occasional sport like Mendeléeff or Mendel or Einstein who steps right out ahead of the crowd.

"But even the sports have no special magic. Give the rest time enough and the right urge—commercial or other—and sooner or later they would stumble along pretty much the same road the real explorers discovered."

He broke off abruptly. "Excuse me for lecturing."

"What you say is awful."

"Thought so myself," he muttered.

"No; but I'm serious. If there is no way of suppressing a discovery that might be used by fanatics—like my brother—to wreck the world, what are we to do?"

"Let nature take its course, I suppose."

"We must not! Give us ten years more to work, and we shall have started the reign of reason and common sense."

"With the sort of thing you are doing? I'm no pessimist, but I doubt it. There's an alternative, however. If your brother's scientific staff is just on the point of making some particularly devilish invention to put the tanks, the machine guns, and the battleships on the scrap heap along with the gas bombs and the flasks of plague bacteria, you might try to steal it. Then tell the world what it is, so that all the nations can start fair. If they vote unanimously to commit suicide they might as well."

"You will not suppress what you find?"

"My chances of finding anything of practical importance are too slim to be worth bothering about. And if what you say isn't all just a wild nightmare, I am more likely to be suppressed than any discovery I may be unlucky enough to make. After I have made it, of course—if I do."

Nara did not contradict him, and Jay sat silently wondering whether he was as crazy as she appeared to be.

Nara got up and opened one of the sliding windows. For some minutes she stood quite still, looking up at the broad band of the Milky Way across the unfathomable blue-black ablaze with stars. She turned and beckoned to him, and he joined her at the open window. The boat appeared to be headed straight for a towering black cliff.

"When we round this little island we shall see it," she whispered.

"What?"

"The glow.

"Oh, I remember."

Almost at the zenith above the black mass of the island Jay detected a faint phosphorescent glow. As he watched, it seemed to flicker and fold, like the pulsing rhythm of a distant and extremely faint aurora.

"What do you think of it?" she whispered.

"If I were inclined to be mystical I would call it both beautiful and evil."

"Wait till you see it all."

The boat slowly rounded the island, and the distant spectacle came into view. Fifty miles away, slightly to their left, transparent yellow flames, through which the stars shone dimly, billowed up mile after mile into the black sky. They seemed to rise directly from the surface of the water.

"You can't see the island from this distance at night," she said, "and in the daytime the glow is invisible. Do you see the stars through it?"

"Plainly. What causes the flames?"

"They don't know. That is one of the things they hope you will discover."

To be continued.

Next month Jay makes a startling discovery concerning the radiations emanating from the dust. On this discovery hinges the success or failure of future experimentation. Don't miss it!

Blue Haze on Pluto

by Raymond Z. Gallun

IT WASN'T TRUE. It couldn't be true! Misfortunes came—yes—but never in such a damnable knot of coincidences. It was ghastly, unreal, unnatural. He must have imagined this.

Terry Sommers touched his forehead with his one good hand, finding there, under the partovac mask he wore, the thick bruise that had stunned him. He glanced about, his eyes puzzled and vexed behind his goggles. Somewhere there must be a reassuring rift in the illusion.

No, it was real all right. Here he

was, in the cabin of the space liner, or rather, in what remained of the cabin. The evidence was before him, around him, beating undeniably into his senses. The coachlike interior was a shambles. He saw twisted girders, crumpled plush, and human bodies that would move no more. Beyond the ports stark ramparts loomed, for the ship had fallen into a deep crevasse where it might not be discovered for months, even though a party would, of course, be ordered out to search for it.

Steep crags, part ice, part frozen atmosphere, reared up in the purple gloom that was daylight on Pluto. Ghoulish forms composed of the same substances, jagged, furry, somehow alive, shining with a phosphorescence of their own, were clustered on the floor and sides of the crevasse. The air of the cabin glittered with frost crystals, for the cold of this outermost child of the Sun was seeping into the battered hull. Terry Sommers could almost feel it nipping at his flesh, even through his partovac attire. The stillness mingled oppressively with the ache in his broken wrist, and the specks of color that danced before his vision.

He watched the glow fade from an illuminator that hung askew from the warped wall. It was a pretty little thing of tooled bronze, fitted with a pink shade. That illuminator was a symbol, somehow, of the luxuries of civilization—luxuries that were only a step from death.

He glanced dazedly down at the belt of stout webbing that had held him in his seat. He recalled the explosion in the machinery of the craft, and the eerie whine that had followed. Then the steward had announced calmly that the twelve passengers must prepare for a crash. They had scrambled into their partovacs, the thick fabric and vacuum compartments of which might at least be expected to shield them for a short time from the bitter Plutonian climate. The concussion of the fall, an instant before he had been stunned, still thudded gratingly in Terry's mind. Yes, it had all happened! He was stranded without hope of succor in a frigid hell of which he knew almost nothing. In thirty minutes it would be night. Just a few hours more, and the cold that came with darkness would get him even here in the ship. That he had not perished in the accident was mockery.

Nor was it his position alone that troubled him. There was something else that he remembered; something that perhaps wasn't his business, since he was only a passenger. But it impressed him now as the crowning misfortune of a series of disastrous coincidences.

An hour or two ago, the man who had occupied the seat just ahead had told him about a mission. In Pindar, the smaller of the two Terrestrial settlements of Pluto, a plague was raging. Sylfane, it was called, Ganymedean in origin. The disease was produced by a siliceous microörganism, entirely different from anything of the kind known on Earth. It absorbed the water from the system of any plant or animal it attacked. More than once Sylfane had been described as the deadliest pest in the Solar System.

TERRY SOMMERS knew what the plague was like, for he had seen cases of it before, during his wanderings on a dozen spheres as a member of various itinerant vaudeville troupes. In five hours' time a human being fairly withered up before one's eyes! In his memory there was a picture of a girl who had succumbed to the dread affliction. With death around him now, it was easy for Terry to grasp the reality of death out there in that lonely settlement—so easy that, after a moment, a kind of blurred panic possessed him.

Savagely he tore the fastenings of his safety belt loose, and stumbled erect. His sound hand, thick-gloved, moved

forward, grasping the shoulder of the man in the seat ahead of him, who had told him about the epidemic in Pindar.

"We've got to deliver the antitoxin!" he cried hoarsely, his words issuing in a muffled babble from the breath vent of his mask. "Doctor Cairns! Do you hear me? We've got to——" Terry did not finish his insistent plea. His arms dropped loosely to his sides. What he had known to be true was true beyond question; this was only a crushed corpse.

Human courage is often sufficient to accept any challenge; but nerve alone, in this case, was not enough. Flesh has its limitations, however high the spirit that directs it. No creature of Terrestrial protoplasm could journey on foot all the way across ten miles of Plutonian country at night, when clad only in a partovac. To do so was a physical impossibility.

There was no way to call for aid or to give the location of the ship so that it might be found here, concealed at the bottom of the crevasse. The radio was not only smashed; it was unreachable. The sketchy S O S, given during the first shock of the unexpected catastrophe, could hardly have stated the position of the crash adequately, even if the operator had been able to predict just where it was to take place. Nor could Terry think of any means of signaling to the several fliers who even now must be preparing to set out from Pindar in quest of the wreck. Unless they came near before dark, there was small possibility indeed that he would be able to indicate the place where the liner had fallen.

However, Terry Sommers was both young and active. In youth, hope may flicker, but it seldom burns out. Terry's attention came to rest on the baggage compartment above Cairns's crumpled form. A hasty inspection enabled him to find the valise which contained tubes of white powder—the Sylfane antitoxin which Cairns had been taking to Pindar. The precious cargo was within reach, and undamaged. The fact seemed to act as a stimulus upon Sommers.

With something definite to do, he felt more buoyant. First he groped through the wreckage, examining the several bodies that he was able to reach. All but one were corpses. A tiny Venusian still breathed shallowly, though he was unconscious, and, Terry believed, dying. His legs, tangled in the débris of the cabin, were broken. Gently Terry disengaged them; though to attempt to take the little fellow along with him toward Pindar he felt would be pointless.

Gritting his teeth to suppress the pain in his shattered wrist, Terry prepared for the venture. The partovac, thick, insulated, and equipped with heating coils in its air-tight fabric, offered considerable protection against the cold, though a space suit would have been much better. He found three flasks of oxygen in an overhead compartment—enough to last perhaps five hours. These he attached clumsily to the respirator system of his mask. Then he fastened the valise filled with antitoxin to his belt. There was nothing else to do. He was ready.

HE WAS struggling with the warped bolts of the door of the cabin, when a soft cry, querulous and low, like that of a bird lost in a storm, trilled behind him.

He wheeled about. The Venusian had come to his senses and had raised himself weakly on his elbows.

Sommers swore angrily. "I can't be bothered with you, you crazy imp!" he hissed. "Why don't you just quit? Why don't you curl up like you should, and get it over with!"

It was brutal. Maybe it had to be. But no, his tone at least could have been less ruthless.

"Sorry," he mumbled apologetically under his mask.

Large eyes, covered by goggles, regarded him through the cavernous twilight. Terry couldn't see much of the Venusian because of the partovac the tiny man wore, but he knew what Venusians were like—frail, fuzzy, with pink skin showing through the fuzz. Like a new-hatched bird. Hideous, pathetic. Tough though; they could take a lot of abuse.

Whether this one could understand what he had said, he couldn't be sure. Venus folk didn't have the vocal equipment to master human speech and the sign language they used to communicate with Terrestrials Terry had never learned. He saw the elf's fingers move in some kind of gesture, but its significance was beyond him. He thought, however, that he detected resignation in the great eyes. They appraised the valise of antitoxin intelligently. Could it be that this imp grasped the situation, and was accepting his fate to increase the chances of others? Yes, it seemed a bit like courage, and a bit like heroism. It impressed Terry Sommers.

His sentiments established a grudging compromise. "I'm an idiot to do this," he grumbled. "But the finish would be the same anyway."

He hoisted the Venusian to his back, and contrived to strap him in place. The tiny fellow gave a chirp of anguish, winced, shuddered, and went limp. The pain of movement had sent his mind back into oblivion. Terry bit his lip to suppress the savage throb in his own wrist.

It took a minute to force an exit from the cabin. Air puffed past him as the door flew open, for the pressure inside had been greater than that of the planet's half-congealed atmosphere. He strode forth into a domain that was never meant to be ruled by humans.

From somewhere deep within him a burst of adventurous gayety surged up. He wasn't an iron man, accustomed to battling the raw conditions of hostile worlds. He was a trouper, a clown, who, with tricks and jokes and song, had added a little leavening to the hard lives of colonists scattered throughout the Solar System. Even now, if the accident hadn't happened, he would be approaching Nadir, the larger city of Pluto, to join up with six others of his profession. "Bits of tawdry tinsel," an old explorer had once dubbed his kind deprecatingly. Remembering this, Terry Sommers gave a grim chuckle in which there was a note of defiance.

Spiny cactiform crystals, shimmering with an inner luminescence of their own, were all about him, breast-high, covering the floor of the crevasse like a thicket of grotesque jewels. They broke with brittle, tinkling sounds as he forced his way through their ranks. Long, slender, furry parts of them groped through the gloom, and touched him in a way that was half hungry, half inquisitive. They were neither plant nor animal nor the inanimate creation of a purely physical process. They lived, and in a dim way they were intelligent! Yet they were not composed of protoplasm, but of ice, and of liquefied and frozen gases which on Earth would have been a permanent part of the atmosphere. Their vital processes were electrical. That much Terry Sommers remembered from the few sketchy accounts he had read of conditions on Pluto, a world which he had never before visited.

It had seemed fantastic; but Terry realized now that it was not fantastic at all. It was natural. The outer planets beyond the orbit of Jupiter were too heatless to support fauna and flora whose protoplasm was similar to that of the fauna and flora of Earth. And so, life, ever adaptable to the conditions imposed by environment, had taken the form of these frigid monstrosities, beautiful yet abhorrent.

LIFE was a queer thing anyway, difficult to describe. You could say that it was something that grew and reproduced its kind and made use of some form of energy; but that was about as specific as you dared be in stating a definition. There were living things on Mercury, Venus, and Mars, quite like those of Earth.

The moons of Jupiter, however, possessed a form of life that was unique, of which the microörganisms that produced Sylfane were an example. Crystalline, it was, hard, composed chiefly of siliceous minerals, indifferent to both heat and cold. And on worlds farther out in the heatless void, these frosty nightmares were dominant, though on at least one of the moons of Saturn, Terry knew that there was a vaporous form of life. There were some scientists who argued that even in the inconceivably hot photosphere of the Sun, a phenomenon might exist which was comparable in many ways to the process of life on lesser spheres!

Awed at his ruminations, Terry Sommers directed his gaze upward. Above was a ragged ribbon of sky, between the crests of the deep trench that hemmed him in. Stars dotted its purple depths. Anæmic sunshine sparkled on the eastern lip of the crevasse.

Terry selected what seemed a favorable place, and started to climb. It was two hundred feet to the top of the rampart and nearly vertical all the way. Hand and foot holds were plentiful but precarious and likely to break at any instant. With every upward surge, rime of frozen air showered down upon his partovac making him look like some fantastic frost imp. The feeble gravity was the trump which made the ascent possible. Burdened as he was, he still weighed much less than he would have on his native planet.

More than a trifle dazed, he reached the top. Glowing through the tenuous, half-congealed atmosphere, was the Sun —a shrunken speck of incandescence billions of miles away. In a few minutes it would set. Then the unbelievable cold of the Plutonian night would begin to strike home, biting through his partovac.

However, he scarcely considered this promise of death now. A kind of dull horror and a sense of inadequacy possessing his mind, he started eastward. Somewhere beyond the serrated jumble of crags and ice hills, rearing in stark denial ahead, Pindar lay. He was attempting to reach Pindar; he was attempting the impossible.

Plod, plod, plod. His feet tramped through a semiliquid slush. It looked like snow, but it wasn't. Up slope, down into hollow, up slope—— And everywhere those frosty monsters reached for him, touched him, and snapped with the brittle jingle of shattered glass. The sound came in a muffled whisper through his helmet. His shadow, long, attenuated, grotesque, bobbed along before him. This was a fairyland of an incomparable bejeweled beauty—and a hell of ghastly grandeur.

Above the crests of the hills, too far off to be examined in any detail, several blobs of haze hung, adding their touch of strangeness to the un-Earthly scene. They were bluish like steel, and semi-opaque. They coiled and swirled in a way that seemed too erratic to be ascribed to air currents alone. Within them was a suggestion of phosphorescence, and they produced a faint, crackling rustle, like an aurora. Terry Sommers wondered about them, conscious of an unease. Some desire for reassurance made him glance back at the Venusian, who had recovered his senses. The little fellow's eyes clung intently, fearfully, to those masses of haze. Sommers decided that it was best to keep as far from them as possible.

Plod, plod, plod. At first the going was fairly easy; then it became monotonous, then torturing. The tor-

ture of it grew and grew, slowly yet inexorably. Out of the purple eastern sky white flakes began to sift down as night approached. A thin breeze accompanied it. Terry's body was becoming curiously numb and wooden.

The light was failing. Dusk. Colder. A panicky terror warmed his flesh a trifle, and he started to run. He stumbled once and fell. Powdery crystals showered around him. He arose and continued doggedly on.

Night brought enchantments that eclipsed the glories of the day. Above, stars burned with sardonic splendor, faintly veiled by sifting flakes of congealed atmosphere. Plutonian life glimmered like serried hosts of huge gems in whose hearts icy fire of every hue throbbed and cascaded.

Terry Sommers did not see their beauty—only their horror. Darkness seemed to increase their activity. Jagged spurs darted toward him, as if attempting to pierce his partovac. If they did —— He tried not to think of that; he only sought to fight on. The blobs of haze were clearer now, yet still mysterious, glowing a frosty, translucent blue.

AN HOUR went by. He must have covered several miles since the outset, running, jumping, plodding. Was he any nearer to Pindar? He thought he saw the red streak of a beacon fan ray sweeping the dark firmament far ahead, yet he couldn't be sure. Above, and a mile to the left, a flier zigzagged, searching for the space ship that was supposed to bring antitoxin to the smitten city. Terry wanted to shout to it, to scream out that he was there. But to do so, he realized, would be a useless waste of effort.

Drowsiness was conquering him, clouding his senses and his ability to reason. It wasn't the effort that had depleted his energies; it was the cold, increasing every moment until at midnight it would almost reach the ultimate zero of space itself. It was sort of puzzling the way he felt. His feet moved as if they composed a being separate from his body. They acted apparently without his guidance, stumbling, recovering, climbing obstacles. They didn't hurt him much; they ached dully, and felt stiff and awkward. He was angry at them for telling him that they ached and that they felt as they did. Why did they bother him? He had troubles of his own, hadn't he? What were those troubles? It was becoming difficult to keep them fixed in his mind.

Fear. Those blobs of blue haze, shimmering and shifting near the horizon, inspired fear in him even more than the jagged monsters that crowded around him opposing his passage. Something he remembered was responsible. On Tethys, third satellite of Saturn, there was a haze like that. It was gaseous, corrosive, alive; it ate through metal and glass and flesh, like an acid. This world was a worse hell even than Tethys. Might not there be a still more dreadful haze here, then? The idea made Terry's pulses quicken with the dread of the unknown.

Yet he was angry—angry at himself for his inexperience, angry at Pindar for being so elusive, angry that Pindar had ever been built, angry at the oppressive weight of his burden, angry at almost everything.

What had Earthmen come to this God-forsaken piece of the universe for? Only because radium and actinium could be obtained here in large quantities. Radium and actinium to feed their damned machines! Young Sommers cursed with the fogged vehemence of a drunken man. His lips pouted like a vexed child's.

Mingled with his resentments, fears were bright, fragmentary bits of his past, jumbled into a patternless medley: Some one named George. Some one called Ellane. Who was she? Oh yes,

the girl who had danced at Vananis, the Earth settlement on Mars. Blond, sweet, really beautiful—— Endless wanderings, here and there, on this planet and that—— Rocket ships, baggage tags, costumes, jokes, jingles of music, gay, tragic—— Mars—the cultivated lands roofed with glass to keep them warm; machines to free the oxygen from the red ferric oxides of the soil. Silk tapestries, carved stone pillars, friendly shadows. And warmth—damn it!—warmth! Trouper, clown—bits of tawdry tinsel—hell! Venus—terrifically hot and fiercely cold, but never as cold as the mildest day on Pluto. Io, Ganymede, Callisto. The Rings of Saturn—— The domed Earth colonies everywhere. Why?

A feeble movement in his burden aroused young Sommers a trifle and made him remember the Venusian he carried. Terry was angry because he was there. "Little fool!" he mumbled several times. "Little useless fool!"

One of those clouds of blue haze was shifting closer in what seemed stealth. But it was all so indistinct and illusive. Terry stumbled on a crystal thing, recovered himself, and then kicked it with vengeful force. But he was reeling. A few steps more and he would be down.

Again the Venusian moved. Then he voiced a piercing scream that even his mask could not muffle effectively. It sounded like the cry of a terror-stricken demon. Once more he sent that unEarthly yell of his echoing into the night.

Terry was furious. "Stop that!" he growled dully. "Stop! Do you want us to be devoured? If you're scared, keep still anyway!"

However, if the tiny fellow understood his command, he did not obey. Again he screamed.

Clumsily Sommers aimed a blow at him. His hand, numb and wooden, fell glancingly; the Venusian strapped to his hip, crumpled.

Then Terry tried to dodge up a gorge, inspired by some dim hope of eluding the haze. He saw that it was useless. The shrill vibrations of the yells had impinged upon some sensory faculty which those clouds of gaseous life possessed. They were sweeping toward him from all sides. And the fog of unconsciousness, produced by the cold, was thickening in his brain. He saw sinuous, fiery shapes of vapor squirm and wriggle in the air about him. And there were things that looked like the carved heads of devils, animated.

With a last spurt of energy he fought through the thicket of frost monsters around him, and reached the summit of a knoll. His body swayed, sagged; he toppled in a heap amid glassy fragments.

Was that Pindar he had glimpsed on a lofty plateau several miles ahead? Or had he only imagined that he had seen a great crystal dome ribbed with metal, glowing like the domes of all colonial cities? It didn't matter now. The city was out of reach. It had always been out of reach. It was not worth bothering about. He was very comfortable here.

The blue clouds converged upon him. Sinuous wisps of vapor touched him. He felt the first electrical tingle of their caress as they began to eat into his partovac. Corrosive death! Funny he wasn't impressed. Mingling with the hiss of the oxygen valve in his mask was a hypnotic whisper and crackle like that of an aurora.

Trouper—here, there, everywhere—— Wirrah, Venus; Oktor, Callisto—— Bits of tawdry tinsel—music—Lita—— Those past impressions continued to swirl in the brain of Terry Sommers, till, at some indefinite moment, the process ceased.

AWAKENING was a surprise. There was the smell of disinfectant about him. Bright lights and white walls. A pillow was beneath his head.

His body ached a trifle, but not enough to be annoying. Bandages covered tender areas—frostbites mostly. A man was near by, busy with something. He was elderly, and wore a small Vandyke beard.

Several moments passed while Terry sought to straighten matters out. Then, sure that he made no error, he greeted: "Hello, doc!"

The physician wheeled, but before he could say anything, Terry flung a volley of questions at him.

"We've been wanting to tell you, young man," the doctor replied huskily. "We've been wanting to thank you. Yes, this is Pindar. The antitoxin you brought has saved us."

"But who found me, and how did they find me?" Terry insisted.

"Addison's fire," said the doctor. "It collected above you in a huge mass. The patrol fliers were searching for the space ship, and naturally they investigated so huge a cloud of the fire, since it usually indicated the presence of something interesting."

"The blue haze, you mean?" Terry inquired. "I thought it was dangerous."

"The blue haze," the physician answered. "And it is dangerous—the most dangerous thing on Pluto; next to the cold. See what it did to your partovac! A few minutes more——" He shrugged.

Terry glanced at the worn garment flung limply over a chair and shuddered. It looked as though moths had been at it, though moths could scarcely have eaten into the composition-doped steel-and-asbestos texture of its fabric.

"But it saved your life," the doctor went on. "The fire is alive, electrical. It creates a small quantity of heat within itself—enough in your case to keep out the cold until you were rescued. But it was a terrific gamble. We wondered if you did it purposely, or if it was just a coincidence. The fire is sensitive to short sound waves. A high, shrill note will attract it, you know."

"I didn't know!" Terry burst out with enthusiasm. "The Venusian did, though! It was he who attracted the haze, and I thought he was just scared! Where is he? Is he all right?" Sommers had raised himself on his elbow.

His informer's features brightened. "He's all right, or will be when his legs heal," he responded. "You are more frostbitten than he is. Look behind you!"

Terry turned. In the bed beside his lay a fuzzy little man with great eyes. The eyes were watching him with a curious twinkle that had the quality of a smile, though smiles Venusian faces could not register. Terry felt awe, and a strange inner warmth.

The doctor uttered an odd, whistling note, attempting a Venusian word. "That's his name," he explained. "He's been here in Pindar quite often. Quite a character. Biology is his hobby, but he's one of these show people. From your passport I gather you're one, too."

Young Sommers was unaccountably speechless. Intently he watched, while the fuzzy little man drew something from under the bed covering. It glittered as a bandaged paw raised it to his lips. A harmonica!

Then he began to play—a curious jingle, Earthly yet un-Earthly. It was the jingle of tinsel, and yet there was hard steel in it somewhere.

Terry chuckled softly. Contrasts! It was funny to see a Venus elf blowing a mouth organ! There was lettering on the instrument. He couldn't read it from where he was, but he suspected with a nostalgic twinge, that it spelled: "Made in U. S. A."

His hand went up in a sort of salute. "Hi, trouper!" he said.

Electrolytic Onslaught

A bombardment was succeeding against a supposedly impregnable fortress and it spelled treason

by John Duthie

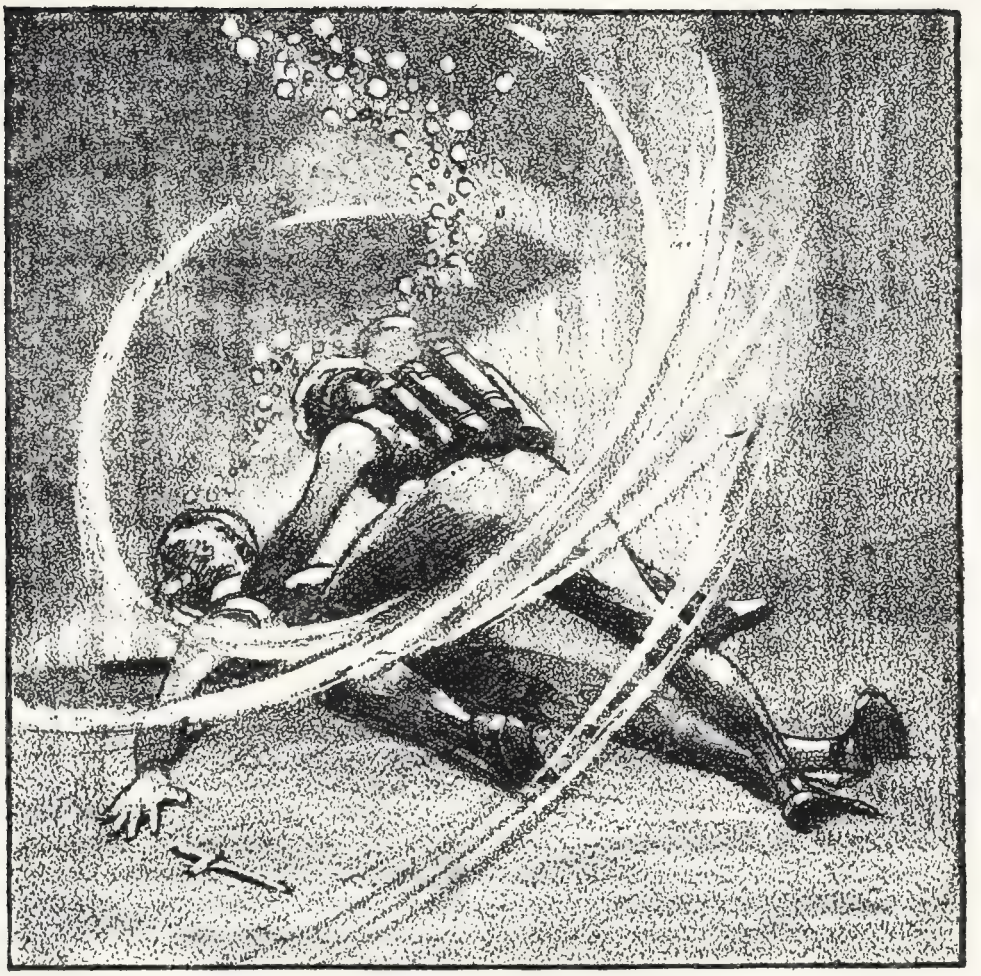
IT WAS in the year of our city, 214. The passageway along which I walked was the narrow slit between the concentric concrete walls which inclosed the city of Submara, located on the ocean floor, some 5,000 feet beneath the surface of the water. On either side of me huge, brightly illuminated walls swept high above, as far as the eye could see, in twin parabolic curves that were terminated by an immense dome of quartz. Ahead, the catwalk lost itself in the circular curvature of the walls. There was no one in sight. Only the necessity for constantly inspecting the walls—our single safeguard against the unrelenting pressure of water—accounted for my presence.

My lonely vigil, as I was pleased to note when I passed the fluted sector, was nearly over. Barely 2,000 millipersecs separated me from the transmurgence gate, which marked the completion of my routine tour. Two hundred paces, and then—the delights of the city and the exhilarating prospect of once more seeing my beautiful Noma. I pressed forward eagerly.

OUR civilization was certainly unique. Originally the ruling caste of an empire which had included all of the Transeanian basin, we had been compelled to flee by an uprising of our vassal Transeanians—a technically ingenious race, but one which was brutish and perpetually wrangling. For centuries they had done our bidding, and when at length an opportunity to free themselves of our bondage presented itself, they had seized upon it with all the avidity of long-repressed desires.

Their hatred toward us knew no bounds. Harried and pursued, we had sought relief from their fury on the shores of a granitic island far out from any of the continents. But their lust for our blood was still unsated. Knowing that if we survived, our vengeance would one day direct us back to our former home, they bent every effort toward exterminating us. And to a large extent they had succeeded. In a few terrifying years our population had been cut savagely from the select multitude who had ruled in regal aloofness over the hordes of Transeanians, to a mere handful of shivering, stoop-shouldered beings who clung precariously to the sides of a precipitous island.

Here we had rested for a time, building up our strength physically and mentally, preliminary to reconstructing our civilization. But scarcely had we devised a method for quickly converting the granite of the island into an instantly setting, waterproof concrete, when the demonic persecutions of our enemies recommenced with unprecedented vigor. In seven attacks by a swarm of terredorplanes the island was rendered incapable of supporting even the small amount of herbiage which had hitherto existed upon it. And we—such as survived the



For just an instant the tip of his head passed into the protective ray zone. He lay still.

devastating attacks of electronic detonations and deadly gases—were driven *into* the water; whereupon the Transeanians, thinking us perished—as indeed we might well have been—departed, leaving us with only the less dread forces of nature with which to contend.

Our plight was sufficiently serious. We had as yet no device for breathing under water. We had little or no protection against the cold. Our supply of food—in the form of dehydrolyzed carbohydrates—was none too ample, and there was no prospect of our being able to replenish it from the raw materials available. At this critical moment, however, providence, which had thus long frowned upon us, provided what we in even our moments of brightest optimism could not have anticipated: our island proved a veritable staff of life.

Even as our people bobbed about in the water and clung to rocks, a lowering of the tide revealed the island as a mushroomed one, and under the great

umbrellalike ledge a series of jagged caverns yawned outwardly upon them. Inspection disclosed that centuries of beating waves had transformed the island's stem into huge chambers, which, once air outlets to the ground's surface had been made and the great gaps through which the water of the ocean poured had been blocked up by means of our newly perfected duthian concrete—as applied with a modified gunite sprayer—rendered our continued existence much more probable.

Our unceasing endeavor to better ourselves, and our resolve to one day repay the Transeanians in their own coin, kept us continually changing and improving our surroundings. The Transeanians believed us exterminated—that was well; we could work unmolested and increase our strength against the time when they inevitably would discover that their aim had not yet been achieved. Meanwhile, the island abounded in mineral and ores; the water near by contained fish, plants, and rushes. We not only existed; we actually throve.

We developed a self-containing diving suit of transparent material: sillicane—made by a fusion of specially treated seaweed and sillica. We perfected powerful boring tools; we constructed caissons and bulkheads; we built enormous air compressors—and prepared to erect a civilization where man had never before lived! Briefly, we bored through the center of our island to the ocean floor; we tunneled out some distance. There, working like so many moles, we began the incredibly immense task of constructing the walls between which I now walked. Our knowledge of physical and chemical laws surpassed that of any other race on earth; but despite that fact, nearly a century elapsed before our city—Submara—was ready for occupation.

In that space of time we had built the mammoth walls, we had floored our foundation, we had constructed homes. We had evolved massive generators—located outside the walls and operated by the ceaseless movement of the tides—to supply us with electrical energy for our lights, our heat, and our ultra-violet-ray lamps. It was these lamps which were the most essential factor in our existence, for without them we should have been unable to develop the super-gigantea flora which furnished us with the oxygen whereby we lived.

SUBMARA was elliptical in outline. At either end was our "countryside," which contained not only various plants and crops, but also the vast distilleries, the generator houses, the concrete repair stations, the weaving looms—our garments were made of a silky substance, fibranese, derived from seaweed—the viaducts, the power lines, the photosynthetic lamps, the mining shafts, and, busiest of all, the chemical laboratories wherein were elaborated a wide variety of the things demanded by a complex civilization.

The chief pride and glory of Submara was the city proper, which was bulwarked off from the rest of an additional circular wall. Here, under the gorgeously colored quartz dome, soft music lent its magic to produce an effect wonderfully soothing. Synthetic perfumes filled the air; the pavements were carpeted with woven rush, and on every hand were to be seen the finest products of our painters and sculptors, who worked not to produce isolated pieces of art, but to provide façades and vistas of complete and satisfying beauty.

Because of our limited space, and the Transeanian menace which kept us from leaving the city, our greatest care was to avoid becoming stifled by the monotony of our surroundings. Consequently, the appearance of our buildings and the arrangement of our minor appointments were periodically changed.

Secondly, an active social life was de-

manded of every individual. Apart from the large central administrative and control building, the most impressive structure in Submara was the clubhouse. Here was to be found all manner of diversion and entertainment: music, art, reading rooms, halls for conversation, dancing, dens for the smoking of morphium—a floral extract which induces a joyous, liberated frame of mind.

In addition to this, our daily lives were carefully regimented. Every man, woman, and child in Submara was continuously occupied, either with his routine task or with some vigorous divertisement. The result was a state of great harmony—a harmony which, by reason of occasional opportunities to dissipate petty irritations through contests and sports, did not tend to become oversweet and boring. The beneficent effect of these contests was further aided by the continual small changes in our climate which we were able to bring about by manipulating the heat-producing coils and the humidifiers.

SO MUCH, then, for the background of our civilization. I was walking along the passageway between the twin walls which shut up Submara from the sea, when, some fifty paces from the transmurgence gate, I beheld a blotch disfiguring the outer wall. Closer inspection revealed that the concrete at that point was soaked through with water, although no pool had yet formed.

I was undisturbed. Such an occurrence was by no means rare, and it was for just such occasions that we kept in readiness a crew of cement workers. Therefore, it was purely routine for me to step up to one of the communication stations which lined the way and report the need for repair.

Waiting the crew's arrival, I walked back to the moistened spot of concrete and watched the frothy little bubbles of air, as I thought, burst. Like some tremendously magnified and growing amœba, the spot spread out its greedy hands, lapping irregularly at hitherto dry areas. A thin little roll at the perimeter kept advancing with what seemed incredible speed. I stared a moment, more fascinated than worried, when an impulse made me reach down and rub my finger against the wet concrete. Nothing occurred, except, perhaps, an increase in the frothing. Then I held my finger up for inspection.

I was aware of no sensation of wetness or pain, but as I watched I saw the flesh of my finger turn slowly white, amorphous, and lifeless. My unexpressed thoughts and fears were confirmed. The liquid which was seeping through the concrete was not sea water at all. It was a highly concentrated solution of hydrochloric acid!

The full significance of this thought accelerated the beating of my heart, but my mind operated with undiminished keenness. There was not, I knew, in the entire world enough natural hydrochloric acid to have an appreciable effect on the gigantic walls which bounded our civilization. Some human agency must, therefore, have intervened—and of all human agencies that existed only one, the Transeanians, had cause to press our extermination. My mind came instantly to that conclusion. The Transeanians, unable to destroy us by depth bombs, by submarine tunnels, by radio rays, had resorted to this means of dissolving our walls and bringing about our complete and final destruction!

A wild rage whipped through me, but the necessity for quick, coherent thinking in the face of the impending catastrophe replaced it with a chill tranquillity. The problem was: How had the hydrocholoric acid been produced? The Transeanians could not, I knew, have manufactured the acid at home and transported it via terredorplane to the area surrounding Submara. That would have been an impossible task. Conse-

quently, the acid must have been produced by some electrolysis process which made use of the ocean's salt water. How could this be done? Very simply. Sea water consists of ordinary water—oxidized hydrogen—and salt—sodium chloride. By means of electrolysis, aided by a powerful catalyst, the hydrogen could be released and made to combine with the chlorine of the salt, thus producing hydrochloric acid. The Transeanians needed only to place a huge, hollowed electrode filled with the catalyst close to our walls, connect the electrode to a source of power, and the scheme was complete!

The arrival of the repair crew brought me to myself once more. With practiced movements, the dark-skinned workmen set about their task. A gunite sprayer in the hands of one poured forth a heavy stream of liquid concrete which hardened as soon as it came into contact with the wall. But the ever-spreading, inexorable wet blotch kept coming from beneath it! It took only a few moments of this to convince me that our method of making concrete could not keep up with the speed of the acid's destruction. There was no alternative. The acid about our walls must be diluted immediately and the cable which furnished electrical energy to the electrode must be severed. I resolved to hasten to the city, and with a muttered word of encouragement to the workers, I set off, endeavoring with all the force at my command to keep stark and unreasoning panic from gripping me.

I gained the entrance to the central bulwark quickly, and here I paused for a moment. Within, our people milled about, dressed for the period of recreation and entertainment. Laughing couples, bound for the club, chattered gayly with each other. A happy spirit of camaraderie hung over the air. Arms were waved in salutation to passing friends.

A deep feeling of love and responsibility for these people passed over me. It was true that I was only a Minion charged with the maintenance of walls; but the sight of so much thoughtless dependence upon the competence of workers like myself made me doubly anxious to prove myself worthy of such trust.

THE CITY was brilliantly lighted, as for a festival. Lulling music played from the central dome. The sweet odor of anastheleas was heavily present. It was a time for love and freedom from care. I thought instantly, of course, of Noma; but the necessity for communicating with the head of my department forced me to shake myself regretfully and hurry on my way, jostling through the friendly crowd.

I came, presently, to the central headquarters of our civilization—a tall, many-stairwayed, circular building which contained the controls on light, power, music, oxygen, heat, and humidity, as well as the administrative headquarters. Quickly I darted through a small archway, traversed a short hall, and emerged in a court. There I bounded up a spiraling flight of stairs and found myself on a familiar balcony.

On this floor was located the protective ray division—the division in which Noma worked. The window of Noma's room was shuttered—as, at that hour, it should have been; but as I scurried past on my way to my own headquarters, I thought that I detected the flash of a light within. Startled at the thought that Noma might still be in her room, I paused and retraced my steps. Then, leaning my head against the shutter, I peered into the room. All was dark, and a heavy, desolate silence prevailed. Apparently I had been mistaken.

Disappointed, I turned to go, but as I did so a muffled sound came to my ear. This was too much. Despite the urgency of my mission and despite the terrible danger which threatened Sub-

mara if steps were not taken to forestall the slowly dissolving walls, I forced open the light, cellulose shutters, vaulted boldly into the room, and stood for an instant, motionless. At first I could see nothing, but as my eyes became adapted to the dark I became aware of a huddled figure lying on a divan in the far corner.

"Noma!" I called. And that was the last thing I remembered for some time. As I started forward, some heavy object came down upon the back of my head with a whack that made a confusion of light dance before my eyes. I reeled, tottered, and fell. Bleak oblivion possessed me.

When I came to my senses again, it was still dark. How much time had passed I had no way of knowing. I was sprawled limply on the floor. A dull throbbing beat upon my brain. Mechanically I felt the back of my head. There was a deep dent in the fibroid helmet which all workers must wear. Only the fact that I had neglected to remove it upon entering the city accounted for my still being alive. Otherwise the blow would have crushed my unprotected head like so much plaster.

I rose to a sitting position and shook my head vigorously, trying to clear it. My success was small, but a memory of what had occurred up to the moment of my being knocked unconscious distracted my attention. There had been, I recalled, some one lying on the divan. Was the person there now? I switched on the light and looked. No. There was no one, and no sign of any one having been there. Save for the shutters which I had splintered in entering, the room seemed normal.

As steadily as I could, I walked to the door and entered the hallway. My purpose was to find Ahlen, the head of the protective ray division, and tell him what had just occurred. But my recent experience had made me cautious. When I heard footsteps coming in my direction I slid quietly into an open doorway and waited patiently for the person to pass.

It was Ahlen—but such an Ahlen as I had never before seen. He moved with a furtive step, and an ashy fear was on him. Furtively he glanced about; though not, fortunately, in my direction. Then, assured that no one was observing him, he entered a small room adjoining that in front of which I now cowered. A terrible suspicion of the man sprang into my mind. Why should he, the head of a division and one of the trusted Counsels, act in so surreptitious a manner? I felt certain that Ahlen knew a great deal about the blow I had received.

AHLEN was small, slight, and suave. An uncommunicative person with a peculiar mocking smile and a consuming ambition, he was not well liked by those with whom he worked. But his acknowledged genius with rays of all sorts had earned him a vast amount of respect. It was his duty to see that at all times our city radiated the powerful tesla rays which destroyed life, ruined machinery, and detonated explosives. And it was upon him primarily that our security against all sorts of ingenious attacks by the Transeanians depended.

I crept cautiously to the doorway of Ahlen's room, thinking that I might hear something of what he was doing; but I was still so wabbly on my feet that I inadvertently lurched against the door. My head struck against it with a resounding blow. I drew back instantly and pressed flat against the wall, but the damage was done.

From within, Ahlen's voice called ominously, "Who's there?"

I made no answer. Instead, I waited breathlessly near the door, hoping that Ahlen would emerge, that I might pinion him. But no such thing occurred.

The door swung open, it is true, and for a moment I had hopes that he would thrust his head out for a look down the corridor, but I was disappointed. Then, when I had fully resolved to make a dash into the room, come what would, a familiar voice rang out with an appeal that made my blood run cold. It was Noma's voice—muffled, but unmistakably hers.

"Dion!" she cried. "Don't come in ——" That was all. The next instant there was a growl of rage within and her words were cut off abruptly. There came to my startled ears the sound of scuffling. It was enough. Disregarding the warning, I darted into the room —to find Ahlen grappling with Noma, who had become partially freed of some cords which bound her. Ahlen was covering her mouth with one hand. With the other he held an electronomic pistol, which he pointed menacingly at me. His lips were drawn back savagely.

"Close the door behind you," he snapped.

My anger, however, made me impervious to fear. Instead of obeying his command, I hurled myself upon him. There was a short *spat,* a burst of stinging flame, and I fell helplessly at his feet. Then there came a sharp cry from Ahlen, and his pistol dropped to the floor near my right hand. Noma had deflected his arm as he shot at me, and an instant later she had bitten his wrist severely. The shot, thanks to Noma, had taken effect only in my left shoulder and, though badly hurt, I was not entirely incapacitated.

Ahlen made a grab for the gun, but Noma fought him off, hampered though she was by the tangling ropes about her. I realized the importance of seizing the gun before Ahlen did, but the shot in my shoulder, coming on the heels of the blow which I had sustained, made me curiously weak and irresolute. Consequently, even though I picked it up, Ahlen had had sufficient time to thrust Noma aside, and to rush through the door and close it behind him. To fire after him was futile. I laid the gun down by my side and rested my head for a moment.

Noma came to me and raised my head in her arms. She had freed herself of her bonds, and the only marks of her recent captivity were where a gag had been placed about her mouth. Her sweet blue eyes, mellowed now by compassion, shone brightly. She looked beautiful.

"Are you badly hurt, Dion?" she asked softly.

I shook my head weakly. "Not badly. My shoulder——" A thought occurred to me. "But Ahlen—we must catch him!" I rose up a little excitedly. "He must not escape!"

Noma pressed me down soothingly. "He cannot escape," she said. "There will be time for him later. Now we shall attend to your shoulder."

I submitted helplessly. She slit the sleeve of my tunic and disclosed the wound. A long, ugly burn had been caused by the pistol, and in addition the nerves had been temporarily paralyzed. The arm, I realized, would be useless to me for some time.

Noma, however, was quite cheerful. "That isn't so bad. In a few days you won't remember anything about it. Now wait here until I get some ointment. I won't be long." She patted my face lightly and turned to go.

"But Ahlen might still be here!" I cried. "Take this." I held the pistol toward her.

Noma laughed grimly. "No, I don't think Ahlen will be found here. He is, if he is wise, making every effort to leave us."

There was a curious implication in her voice of knowledge which I did not possess. A dozen questions came to my lips, but Noma silenced me quickly. "I will explain when I come back," she said. She turned and went out.

WHILE I lay waiting, I heard a curious, intermittent clicking sound which abruptly ceased. It seemed to have come from a small table standing in one corner. I arose and, still weak, tottered over to it and examined with some curiosity the device which occupied it. It was a little machine similar in form to a televisor, but instead of a screen for the reproduction of images there was only a rather crude piece of sillica slate upon which a hollow needle filled with argus coloring made little perforations.

Only a cursory survey was necessary to convince me that it was a supersonic communication machine—a machine, making use of sound waves above the range of human audibility, which we had elaborated carefully in drawings, but which had, as far as I knew, never actually been constructed. Ahlen apparently had built this one without the knowledge of other members of his department.

With this fact in mind, I glanced more carefully about the room. I noticed for the first time that there was no window in it, and that the walls, including the ceiling, floor, and door, were covered with felstan—a soundproofing material. The door was stronger than any door in Submara needed to be. And there was, against the wall, an opened chest which contained a fully equipped work kit. Ahlen could, with the utmost safety and privacy, conduct almost any experiment that he desired!

A renewed clicking of the supersonic machine directed my attention to it. I walked back to the table and glanced idly at the slat. What I saw there made my scalp tingle and my heart pound with excitement. There, forming under my very nose, was a message in Interoceanic code! It read, "How is dissolution proceeding? Current has been doubled to maintain ionic pressure. Communicate at once. Why have you not answered sooner?"

There was no signature, but in a flash the isolated experiences of the day linked themselves together. Ahlen was working hand in fist with the Transeanians! Production of the hydrochloric acid outside our walls required the placing of a huge electrode—of some such material as argium, say, which was comparatively cheap and was an excellent conductor. And the placing of the electrode would have required secrecy. To have dropped the electrode from the air would have been to warn us of a potential danger. How much easier it was to have Ahlen—as head of the protective ray division—turn off the rays momentarily while, from the surface above, the Transeanians carefully lowered the electrode into a suitable position close to our walls!

Noma's entrance with ointment and bandages at this moment interrupted my meditations.

"Why, Dion!" she exclaimed in surprise. "I thought you were badly hurt."

Ignoring her demand that I lie down and have my wound dressed, I told her of the dissolving walls, of the message which I had just read, of the part which I believed Ahlen to be playing.

Noma nodded her head understandingly. "Yes, I know," she said thoughtfully. "Ahlen had been acting queer for some time, but of course I did not suspect him of treason. It was only today, a short time before you came along the balcony, that I even caught a glimpse of the inside of this room. Ahlen went into a terrible rage. He bound me and carried me to my room. And then—then you came."

"But why should Ahlen do this frightful thing?" I demanded hotly. "Why should he want to bring about the destruction of Submara? He must be mad!"

Noma put her arm affectionately about me. "He is mad, Dion, but not

in the way you think. Ahlen is a genius —a far greater man than any of us have ever supposed. For years he has been contemplating a number of great projects which can be realized only on the earth's surface, and the thought that he could never live to see his ideas materialized was too much for him. It became an obsession with him and unbalanced his mind. He constructed this supersonic machine so that he could communicate with the Transeanians without our knowledge. He offered them whatever they desired in return for complete freedom of movement and the use of a laboratory. They demanded our extermination—and Ahlen thought that was not too great a price. That's all."

A wave of overpowering indignation swept over me.

"That is not all!" I said vehemently. "We must capture Ahlen and punish him!" A full realization of the importance of immediate action dawned on me. Much valuable time had already been lost. Even now the outer wall might have collapsed—with what fear and panic among our people I dared not think. A plan of action came into my head, and I acted upon it instantly.

"Noma," I cried, "Ahlen will undoubtedly try to leave the city, trusting that he will be picked up by his friends the Transeanians. You must see that the protective rays are kept full on, until I myself order you to turn them off. You understand?"

Noma nodded. "Yes. But what are you——"

"I shall find Ahlen."

I dashed from the room toward the stairway leading to the streets. There was no need, I realized, for informing my superior of the wall's condition—if he did not already know of it himself. What had to be done now had to be done immediately; and for that task I was as well fitted as any one.

OUTSIDE in the streets, all was confusion. Panic-stricken people scurried about without apparent aim. I found my way blocked by a horde of milling creatures. I realized at once what had happened: news of the crumbling walls had reached the city. From snatches of cries and partial explanations about me, I learned that a whole double section of the wall had given way; that the repair crew had perished heroically; that the emergency gates which shut off the city proper had been closed; that evacuating pumps had been put into use; that preparations were going forward for an abandonment of the city.

I had begun to despair of ever getting through the crazed mob, when the central loud speakers blared forth: "All citizens report to work posts immediately. All citizens report to work posts immediately. All shifts of every post report at once. Bring diving suits and emergency rations. Do not run. There is no immediate danger. Report to work posts immediately."

The speakers had a calming effect, and through the little alleys created by a diversion of the mob, I forced my way. Despite the injunction against running, I put on my best speed. Madly, I rushed toward the transmurgence gate, the single remaining exit from Submara.

At the entrance to the passageway which led down to the gate, I found the huddled, bleeding body of the custodian —dead. Ahlen's work, I thought grimly. From all the evidence, a terrific battle had taken place before Ahlen had at length succeeded in dispatching his adversary with some sharp instrument. Ahlen could not be far in front of me. I paused for a moment, deliberating my next step. What could Ahlen do now? Surely his whole mad enterprise had come to an end. Trapped at the end of the passageway, his exit barred by protective rays, what could he do now save yield? Or else, fight

back with the courage of a cornered rat?

But was Ahlen trapped? My absent gaze, sweeping idly over the custodian's switchboard, came to rest upon a series of red lights labeled "Protective Rays." There were fifteen of those lights, and the central one, the indicator for the sector including the transmurgence gate, was the only one not lighted. Ahlen could, with impunity, walk straight out of the gate and go as far away as he cared to!

For a moment I had a wild suspicion that Noma was working together with Ahlen, but then reason came to my aid and suggested the possibility of Ahlen's having himself taken the precaution of jamming up the rays for that particular sector.

"It's true, Dion," said Noma, whom I had called on the communiphone. "The rays for that sector are off. The grid is completely smashed. What shall I do now?"

There was nothing that could be done. To repair the grid would take too long for our present purposes.

"Leave all the rays on as they are now," I told her, "and stay where you are."

Noma started to protest; but I quickly shut her off and hung up the communicating disk.

My first step was to provide myself with a diving suit and a cutting torch from the supply room near by; then, cautiously, I made my way to the exit chamber. The front gate of the lock was still open, and through the transparent insert in the second gate I could see the swirling bubbles of water still entering. Ahlen had just passed through!

Quickly I pressed the lever which closed the front gate, turned on the compressed air to evacuate the water in the chamber, and opened the inside gate. A second later the ocean surged in against me with a warm, soft *plop*. A step or two brought me out onto the ocean floor.

A small whirring above my helmet preluded the bursting forth of a broad, bright beam of light from my norgon lantern. The blackness receded. I looked about anxiously.

Ahlen was not in sight. Could he have risen to the surface so quickly? It did not seem possible. Then I saw a sight which left me aghast. Fifteen or twenty paces to my right as I faced the concrete walls of Submara, lying on its side and pressed closely against the walls, was a gigantic metal cylinder which shone like argium. And back of that cylinder were breaches in the walls of such an extent as I had never imagined.

Fortunately, the breaches opened only into the countryside, but it was only a matter of minutes before the deteriorating action of the generated hydrochloric acid would permit the ocean to sweep over the city proper. Great bubbles, caused by the interaction of the acid on the cement, covered the whole extent of the walls. Even as I watched a great softened segment of the wall collapsed with an outrush of water that nearly knocked me from my feet.

In a rising tide of excitement, I pushed forward, my torch in hand. My purpose was to find the power cable connected to the electrode—that the huge cylinder was one, I had not the slightest doubt. As I strode over the dark, sandy ocean floor toward the cylinder, I noticed radiating out from the walls, a sharp line of demarcation. On the farther side of the line, the sand glowed dully, whereas that on which I now walked was dark. This was due to the inductive action of the protective rays, which had, in order to be effective, to be sharply focused. To tread an inch over that well-defined margin would be to commit suicide.

ALL THIS I noted subconsciously. My attention was directed toward the argium cylinder. I must, I realized, find the power cable and sever it quickly. In a few short minutes our walls would be weakened beyond repair. I hastened my movements.

Fortunately, it was not hard to find the large,, black, insulated cable which rose straight up from the electrode. With a cry of satisfaction and relief, I turned on my torch and placed its tip against the cable. For a moment nothing happened. Then, as the bluish-green flame grew hotter and became a sparkling white, the dark covering of the cable began slowly to melt. And then something crashed into me from above, knocking my torch some distance away—where its undirected flame burned steadily into the sand—and hurling me to the ground. For an instant I was stunned. After having come so close to severing the cable was I at the last moment to be frustrated? It seemed incredible. I rose to my knees. Coming toward me was a figure in a diving suit, a long knife held menacingly in its hand. It was Ahlen. As he drew nearer, I could see his crazed expression through the visor of his helmet. Apparently he had been climbing up the cable toward the surface of the ocean when the sound of my torch had attracted his attention and he had decided, as a last gesture of malevolence to hinder my attempt to save the city.

There was no question of his deadly intent. He advanced toward me as rapidly as the weight of his boots would allow. Slowly I got to my feet and watched his approach. He came to a point about four feet from me and halted. His eyes gleamed venomously.

I began to circle him, when, suddenly, he made a headlong rush for me, the point of his knife extended. I caught his wrist as his arm swooped down, but the force of his lunge was such that the sharp tip of the blade penetrated the sillicane of my suit and made an incision in my breast.

The wound itself was a trifle, but the slit in the suit was more serious. Although the sillicane was largely self-sealing, a certain amount of my oxygen was sure to be lost—and this was a loss that I could not endure. The situation was harrowing. On the one hand, there was the possibility that Ahlen would kill me with his knife; secondly, I might—if I survived Ahlen—perish by suffocation; and thirdly, there was the very immediate and terrible danger to the city. It was the last consideration which made me battle most determinedly. Despite the numbness of my left arm, which Ahlen's electronomic pistol had incapacitated earlier, I grappled with him desperately.

Over and over we rolled, Ahlen stabbing furiously with his knife, I trying with equally frenzied energy to keep its point away. My strength was superior to his, but he fought with the reckless abandon of a maniac. He was slippery, too, and it was only by the greatest exertion that I prevented him from slipping through my arms into a position favorable for a fatal thrust. My head began to hurt once more, and the pounding of my heart made me feel dizzy and uncertain.

I WAS beginning to despair of ever being able to pinion him beneath me, when a lucky jerk sent his knife spinning away from him. He made a spasmodic effort to pull himself loose and seize it again, but I held on grimly. It was futile for me to attempt to grab the knife. I had only the one good arm. But by means of it and the wounded shoulder, I was able to keep Ahlen pinned beneath me.

I then conceived a terrible punishment for him. Holding him as he was, I began nudging him relentlessly toward

the line that marked off the unprotected sector. Half a foot at a time, sometimes only an inch at a time, I pushed him ever closer to that fatal line.

He perceived my intention quickly, and began a frantic effort to release himself. But I was inexorable. Gasping and struggling, we approached, like some odd, dual monster, ever closer. A drop of water, forcing its way into my suit, dropped with a chill reminder on my bare skin. Its stimulus reënforced my waning strength. Closer, ever closer, we came. I could see Ahlen's mouth now, wide open in a mute scream of horror. Ruthlessly I forced him on.

Now he was on the very verge of going over. I permitted my grasp to slip down to his waist. With one final effort, Ahlen attempted to free himself, but it was no use. We had fallen to the ground together now, my arms tightly about his thighs. With my shoulder I nudged against his chest, endeavoring to push his head across the line without bringing any part of myself over it. Once, twice three times, he threw his body aside at the last moment. His face was ashy with fear; but the result was inevitable. For just an instant the tip of his head passed into the protective ray zone, and in that instant he ceased his struggles as abruptly as though some one had split his skull. I felt him go limp beneath me. His head turned an indistinguishable, molten bronze color. He lay still.

My oxygen was all but exhausted. Weak and fainting, I arose from Ahlen's supine body and tottered in the direction of the electrode. Great black blotches flashed before my eyes. Vaguely, as though from a great distance, I seemed to perceive the ocean floor's layout: there was the electrode, the gaping city walls, the small, almost imperceptible torch still blazing into the sand. Stumbling and falling at intervals, I staggered on toward the torch.

How I ever reached the torch, how I found the strength to grasp it and crawl to the electrode, I shall never know. All I recall is that after a lapse of some time, I found myself huddled over the cable, torch in hand, feebly directing the flame at the already scorched covering. And that was all. A racking fit of convulsions seized me—and everything went black.

I AWOKE to find myself in an oxygen chamber, with Noma's pretty face peering anxiously at me. As recognition dawned in my eyes, a look of intense relief and happiness passed over her.

"Dion! Oh, Dion!" she cried happily.

I was too weak to respond immediately. From without, there penetrated to my consciousness the sound of dull, persistent pounding. It was a sound I knew well—evacuating pumps.

"The city," I gasped. "Is it——"

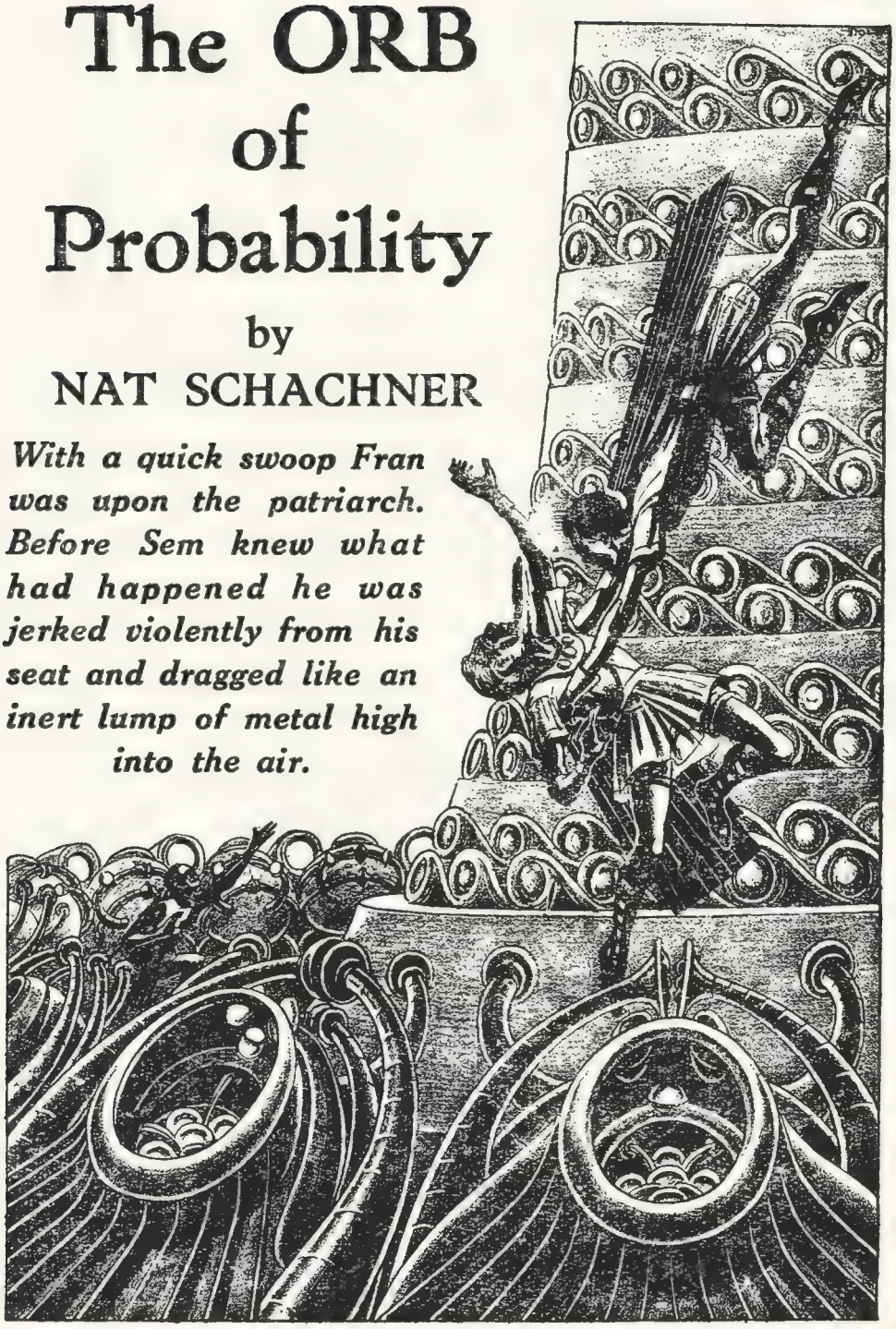
Noma bent down and kissed me tenderly. "The city is safe, Dion," she said.

The ORB of Probability

by

NAT SCHACHNER

With a quick swoop Fran was upon the patriarch. Before Sem knew what had happened he was jerked violently from his seat and dragged like an inert lump of metal high into the air.



THE YEAR 9678 did not start out as if it would prove particularly momentous. It was no different from a long line of preceding years that stretched far back into the dim and fabulous recesses of the fourth millennium. In fact, there was a certain dull monotony, a deadly sameness about the years and centuries and millennia as they slipped imperceptibly into eternity that explained, if perhaps it did not justify, the catastrophic experiment that Fran 19 evolved out of infuriated boredom and an atavistic thirst for adventure.

He stared with jaundiced eyes at the unending panorama of his Sector. He stood, rather than reclined, in itself a most unusual and strength-taxing effort. But then, Fran 19 was a mistake, a carelessly matched aggregation of genes. In former and less polished times he would have been quietly done to death, as a machine with ill-fitting parts is scrapped. But now even that bit of decision was too much for the Guardians of the Mating Cells. They opened somnolent eyes on that Machine that had perpetrated this grievous error, stirred slightly and perhaps uneasily, as if qualms of outmoded conscience whispered of their duty, and subsided into their original torpor.

As a result Fran 19 lived. He was the nineteenth mating of heritable qualities which had been approved in Francis Middleton, of the First Scientific Guild.

Inasmuch as the crude, blundering methods that nature employed for immortalizing the race were subject to incalculable mutations and twists of heredity, it was considered more scientific to employ the new technique of parthenogenesis, or unitary parental birth. Thus, the genes of Francis were stimulated to subdivision and reproduction by the use of the proper solutions, and gave rise to Francis 2. He in turn, at the calculated period when new births were necessary to counterbalance the deaths of a still mortal race, gave of his genes for the emergence of a successor. As like as peas in a pod they were—Francis 1, Francis 2, Francis 3. In the course of time, as speech became more and more monosyllabic and a tiring effort, the patronymic was shortened to Fran.

The first Frans had remarkably short lives, to wit, between seventy and ninety years apiece, but as the momentum of that first great scientific push continued, and disease was conquered, accidents reduced, physical conditions of the exterior world tampered with, and the internal mechanism of the human body more delicately balanced, death grew more and more tardy. Fran 18 had succumbed at the age of 790 years to a certain ennui, a lack of malaise, one might say, that made the burden of this world too grievous for his languid self.

There were even stray rumors that the present generation, of which Fran 19 was a member, was immortal, that only a definite exterior physical cause could bring oblivion and the surcease of death. Fran hoped not.

Already, at the youthful age of 75, he dreaded the long, unending years that stretched monotonously ahead. Rather a brief existence of say 500 years, crammed with the unpredictable, with physical and mental danger and excitement, with futile but vigorous strivings toward something outside oneself, than this creeping immortality in which everything was predigested, prearranged, precalculated for them by the omnipresent Machines.

Several times he had ventured to broach these rebellious thoughts to his friends. Friends, perhaps, was too strong a term for the pale, anæmic relationship between man and man. Woman, with the abolition of the necessity of sex, had become almost indistinguishable from man. But they had edged slightly and languidly away.

Their fluted voices whispered in tired monosyllables.

Fran 19 *was* different from them, was he not? Something to do with his genes, it seemed. Made him sometimes a bit—shall we say, crude? Not like our highly civilized, polished selves. There were times when his voice was loud and raucous, when low animal vigor positively exuded from his body. Once Char 17 had seen him *walking* the flower-spangled turf between the *vistas*. All of a hundred yards, I should say. Walking? Yes, a primitive form of locomotion produced by moving one's appendages alternately forward. Fancy —and here the speaker delicately shrugged the gravity-twisting cells that extended like short vanes from his shoulders—when soaring is so simple.

The narrator fell back on his couch exhausted. He had overtaxed his strength; he had spoken too much. For two days now he would retire into the *quiet*, during which period he would lie unstirring, unspeaking, unthinking, while the Feeding Machine injected liquid nourishment into his veins.

The art of conversation was completely lost. There was no need for it. The world was a perfect mechanism. Nothing ever happened, nothing could happen, to change the even tenor of existence. Each hour was like the preceding, each day like the last, and one century much like another.

THE MACHINES had achieved perfection back in the fifth and sixth millennia. From birth to grave they tended the human race—efficiently, tirelessly, perfectly. They dwelt in huge Machine Cities at regular intervals over the face of the earth. They dug metals from the stubborn ground; they powered themselves with smashed atoms. They sent pulsing surges of current through the ether to the subsidiary, personal Machines that tended the humans in their homes.

Within their gleaming interiors was manufactured the synthetic food—a perfumed liquid broth—which the Feeding Machine injected directly into the veins. They catalogued and kept alive in vitreous culture the precious genes of inheritance and arranged them in the proper combinations when the Statistics Machine calculated it was time for new births.

Fran 19 was an almost unheard-of accident. It was for rare occasions like this that a few human beings with dim memories of forbears who had been members of the Scientific Guild, maintained a nominal supervision of the Machines.

The Machines reared the children in automatically regulated incubators. They dressed, fed and clothed the people; they propelled the gravity-twisting cells by means of which man could circumnavigate the world, if he so desired, in a few hours. But very few did. There was no reason for it. The ends of the earth were an exact reproduction of the home Sector.

There were no deserts, no wild spaces, no glaciers, no jungles. From pole to pole the Sectors spread in endless monotony. There were no storms, no droughts, no mutable weather. A vast, unchanging blanket of warmth infolded the globe. Rain fell only when and in the circumscribed areas that it was necessary. Even the mountains were carefully trimmed and manicured. The oceans surged to the tides as of old, but no winds ruffled their broad bosoms to uneasy wrath, and huge retaining walls held them safe from harm.

Fran 19 stared out at the placid, interminable scene for the thousandth time. But this once the usual ennui, the unutterable boredom, the feeling of being swathed in soft cotton wool, did not possess him. He was in deep thought. Little ridges of flesh puckered up his ordinarily smooth forehead, little pulses throbbed in unaccustomed parts of his

body. Excitement, such as he had never known before, swept over him in dizzying waves. It was alarming—and it was thrilling.

He turned for a last look at his crystal-inclosed laboratory. The apparatus, quiescent now, was plain for all the world to see. There were no secrets in the 97th century. Nor was there vulgar curiosity. The very fact that a human being, in this day and age, chose to exert himself unreasonably with messy wires and tubes and apparatus when the Machines were all-sufficient, gave rise to slight lifting of eyebrows, and nothing more.

Fran 19 laughed shortly. In all the world possibly he was the only one who thought the frontiers of science had not been reached, that with human experimentation, as against the cold precision of the Machines, new theories, new concepts of the universe might be evolved. For twenty years now he had worked in his laboratory, learning from the Memory Machines the science others did not trouble to know. Then, with their assistance, he had performed all the great path-finding experiments of the past. Slowly at first, laboriously, for the Machines required new settings for the unsual work, and his own fingers were clumsy at these tasks, but later with increasing rapidity and expertness.

One day, however, not two years before, the Tending Machines stopped all work. Not that they rebelled—they were not geared for human emotions—nor because any Guardian interfered—man was a free agent in the 97th century, unshackled by law or superior force—but because the Machines had reached the limits of the knowledge which had been originally incorporated into them and which they had been able to extend for themselves by purely mathematical and physical processes. Beyond that, to achieve new concepts, new hypotheses, if such there still remained in the universe, something else was required, something that no machine could duplicate, something which seemingly had died from persistent disuse. *Imagination!*

II.

FOR WEEKS Fran 19 had moped and sulked at his idle Tending Machines. His imaginative processes were still atrophied. But that accidental mingling of unpedigreed genes with the pure, but unexciting strain of his ancestors, continued to ferment. A little glimmer struggled painfully through his mind. The last experiments, dealing with Wave Mechanics and the innermost structure of the electron, furnished the spark.

He set to work again, a new grimness in the soft, hitherto unsullied lines of his face. He even immured himself for three and four hours at a time in the laboratory.

For two years Fran worked. The Tending Machines assisted, but only under specific orders. They were beyond their depth. The Calculating Machine, of course, did all the mathematical integrations. And now it was completed—that round, crystalline globe in the farther corner, in whose transparent depths was an intricate maze of metal.

For the moment Fran 19 was stricken with panic. He was, in spite of everything, the product of his age. He shrank from the unfathomable possibilities of this thing he had created. There was even danger—danger that had been eliminated from the world for thousands of years. It was one thing to revolt in one's soul from the ineffable peace and accompanying boredom of existence; it was another to be confronted with the fact of disorder, confusion, physical danger and the not remote probability of annihilation.

Then his face hardened. The shiver of fear passed and left in its wake steel. The thrill of excitement, the incalculability of what faced him, even death,

made him alive, as he never had been before. This was living, this was life! A song burst from his lips, tuneless, rusty. Man hadn't sung for centuries. What had there been to sing about?

He spread his flying vanes. He needed witnesses for his experiment, in case—— A twitch of the shoulders and he soared off into the air. The vanes were uncanny. Slight twitches and they bent the gravity lines this way and that, propelling him on an appointed course. The sun's tempered rays were glareless and bathed the earth in a pleasant glow. A uniform layer of ionized atmosphere some three miles up took care of that. The warmth was that of a tepid bath, slightly under body temperature, comfortable but enervating. The Weather Machines provided for that.

His goal was the City of the Machines. There were two men with whom he wished to talk, Guardians both. As Guardians they were a step above the rest of humankind in initiative. No law compelled them to their self-appointed tasks; only a dim and fast fading tradition of service inculcated in their genes from remote ancestors of the Scientific Guild.

The Sector dropped away. Trim trees spaced beneath. Then the City of the Machines loomed into view. A great rounded dome of crystal clearness. He descended swiftly. At his approach a section swung noiselessly open. The shadow of his body had impinged on a photo-electric cell, closed a circuit. He floated down to the ground level. For a brief moment he stared curiously around. It was not his first visit. Years ago he had been a Guardian, until the tireless, noiseless movements of the Machines had oppressed him with a feeling of the futility of the human race, of his absolute inconsequence in the scheme of things.

Now he stared at them with new eyes. He even felt superior to their glistening, flawless surfaces. There was that in his *vista* which surpassed them all, which might even—and again the shock of the unknown tingled through him—bring about a new order of things, bring blessed chaos where monotonous peace had reigned so long.

IN THE very center of the crystal city was a huge, gleaming cylinder. It sprang solidly from the hard floor surface, thrust upward its smooth, rounded flanks until it penetrated the transparent hemisphere. At the very top it swelled into a faceted globe that turned with ceaseless motion. Light-blue flares burned within the innumerable facets, ebbed to nothingness, and flared again. Power sped on invisible beams to the Sectors, power and geared instructions to the mobile Machines that performed the local duties.

At the base of the cylinder, and encircling it with spaced platforms to a height of a hundred feet, was the Communications Board of the Machine. A bewildering maze of filaments and impulse receivers and cells. Yet each slender strand had its specific function. Here was determined, by a change in the steady vibratory beat of a Machine, that a breakdown had occurred, that the sensitive balance had been destroyed. Impulses flashed automatically to the sending cylinder for Repair Machines to get under way. Here were prepared the great calculations and integrations whereby the world was run on an even keel. They were based on innumerable sending reports from the individual Machines. Here was determined, on the data of reported death of their wards, the human race, the necessity for new matings of pedigreed genes. In short, the eyes, ears, and brain of a Machine-dominated civilization.

Huge flying transports, automatic in operation, dropped from the sky, nestled to magnetic currents on the landing platforms. Hutches opened automatically,

disgorged their loads of minerals and precious metals from far-off mines into tubes that fed into the proper Machines on the floor of the city.

The atom-blasting units absorbed the gushing stream of bauxite, already pulverized at the mines, and with noiseless, yet supernal forces within their rounded bellies, tore the electrons from their flashing orbits, sent uncounted trillions of positrons on their ephemeral paths, flashed them both into annihilation, and thereby released in a blaze of photon bullets and gamma rays the stored energy of matter.

The Building Machines received their loads of metal and concrete, flew to their appointed tasks. The Cell-Mating Machines were idle now. No one had died within the past year.

A half dozen human beings reclined on luxurious, air-cushioned couches. They were the Guardians. They did not stir; their eyes were blank on somnolent visions. Their services were unneeded.

But there were two, whose couches, close together, faced the all-important platforms of the Brain. These were the Guardians whom Fran 19 was seeking.

Their recognition signals blazed greetting as he dropped to their side. The eyes of the younger lighted up with pleasure. He was about Fran's age, face delicate and girlish, and smoothly unlined. His hands, when they moved, were quick and birdlike. Vic 21 was Fran's best friend in a world where friendship was a forgotten dream.

"You appear excited, Fran," Vic said slowly. "You haven't——"

Fran nodded. He could not keep his eyes from dancing.

Vic half arose from his couch, sank back. "You—you've finished your work?" There was a hint of awe, of overlaid fear in his voice.

"Yes. That's what I came to see you both about."

The older man said nothing, but there was that in his still-piercing gaze which commanded explanation. He had not moved or stirred. His ruddy face, though smooth, connoted age. A patriarchal beard swept down over his tunic. No Barber Machine had ever cropped his whitened locks. Sem 15 was old, almost incredibly old in an era of Methuselahs. He was 1051 years old, the oldest man alive in the 97th century. He had outlived all his contemporaries, seen them succumb to sheer weariness of living, to accidents, to the natural decay of mortal faculties.

SEM 15 had no official power or dignities. No one bowed to his will, nor did he attempt to impose it. Such things were unheard of in the 97th century. But by reason of his tremendous age, by reason of the accumulated wisdom that the slow passage of the years must have brought, by reason of the fact that he had constituted himself a perpetual Guardian to the Brain Machine, he had achieved a certain prestige.

Fran turned to the patriarch. "I did not tell you before, Sem 15," he said respectfully, "because I had not finished; because I feared failure. Even now there——"

Sem surveyed the youth of seventy-five with benign tranquillity. "You have labored, Fran 19, as no one has labored since the memory of man." His voice was rusty, halting, but not unpleasant. "It is not good."

"But this is different, Sem 15," Fran said eagerly. "I have done something new, something that the Machines could never have accomplished. I have enlarged the boundaries of knowledge."

Sem smiled vaguely. "Knowledge?" he murmured. "What need have we for new knowledge? Is there more that the Machines can do for us? Unless"—and a slight flicker of interest showed in his eyes—"unless you have perfected a Guardian Machine."

Fran felt as if he were being bogged

in an endless ocean of inertia. "No, it is not that," he answered slowly. "In fact, it is at the very opposite pole. Instead of still further elimination of human effort and toil, the principle I have discovered and the machine I have based upon it will bring toil and struggle and danger once more to the human race."

Vic's eyes flared with sudden enthusiasm, died down again to a fear—fear of the unknown. He stared at his soft, milky-white hands and said nothing.

But Sem 15 did an unprecedented thing. He jerked bolt upright, long beard rippling over his chest. Then as if the effort had been too great, he relaxed with a long sigh.

"Fran 19 is mad," he murmured to no one in particular. "He is a mistake, a dangerous mistake. I, Sem 15, who was Guardian of the Mating Cells at his birth, am to blame. He is a relic of barbarism, of his tailed ancestors in the mists of antiquity."

Then it was that Fran did an even more unprecedented thing. Never before had man exercised coercion over fellow man. But Fran was overwrought, tense with the completion of his work. Therein lay his excuse for what he did. Therein, and in the fact that by no other means could he have prodded Sem from his Guardian couch. And if Sem did not come, Vic 21 would not have dared.

With a quick swoop Fran was upon the patriarch. Before Sem knew what had happened, he was jerked violently from his seat, dragged like an inert lump of metal high into the air.

Fran's vanes were spread, heading him straight for the shining crystal dome.

"Come on, Vic," he shouted, "follow me. Sem will inspect my Machine whether he wants to or not."

The scattered Guardians raised themselves on elbows at the violence done their eldest. It was unheard of; it was an outrage; it was—sacrilegious. A vague premonition of future disaster flitted like a shadow over their thoughts; then they sank slowly back to their cushioned rest. Vic was horrified. Fran was his friend and like a breath of cold, invigorating wind, but this was really going too far. It was an unwarrantable invasion on man's sacred privacy; it was —— He spread his vanes, twitched, and soared after his friend.

III.

THE DOME slid open at their approach, slid shut behind them. Like a mythical eagle Fran flew, holding his prey in strong clutching arms. Sem 15 had not moved, had not stirred from his limpness. Now he raised his eyes to his ravisher.

"This work of yours," he observed quietly, "must mean everything to you, for you to have done this. I shall look at it."

"It does, and thank you," Fran cried, and released his hold. Side by side the three slid through the air. There was a song in Fran's heart. Sem 15 understood.

They landed on Fran's *vista*. The laboratory gleamed shining and intricate behind the vita-crystal walls. The transparent globe seemed but an inconspicuous part in the array of instruments.

Sem 15 stood gravely before its rounded orb. The rest of the apparatus had taken no more than a slow unhurried glance. Sem had seen equipment like that in the City of the Machines. But this——

"The idea came to me almost in a flash, Sem 15," Fran said eagerly. "I was bored with life, with the do-nothingness that infects our race with dry rot. I wanted to know things, to seek for things unknown. I did not want the Machines to cradle me like an infant."

Sem surveyed the youngster quizzically. Back in his own youth he too had

had such fleeting thoughts, but they had succumbed to the easy flow of existence.

"I started to learn for myself," Fran went on. "It was hard, tedious work, but there grew a certain joy of achievement in me such as I had never experienced before. Then one day, it was over. I had learned all that the Machines knew, all that former generations of scientists had sought out and then declared that the frontiers had been reached. I was in despair. My accomplishments seemed futile. I felt there must be more; something important just beyond."

The words were tumbling from Fran now. "Then like a flash it came. The very last thing I had studied was the problem of Wave Mechanics. An ancient named Schrodinger had founded the science; later men had added to it. Matter is atoms, atoms are protons, electrons, positrons, neutrons. These in turn are aggregations of waves or ripples on the surface of a subether. The electron, for example, is the intersection of series of these waves."

Sem 15 nodded. He was listening intently now, the blankness of his placid existence pierced. Thus far he too had gone before he had left off.

"But this was not all," Fran said excitedly. "Even in the distant past, thousands of years ago, they knew more. They knew that the electron, while obeying the mathematical laws of waves and ripples, was also a particle, in obedience to even more ancient mathematics. But it could not be placed. Somewhere, it was true, it existed within a wave group, but that wave group was indefinite in extent. It had no sharp lines of limitation. It just trailed off into surrounding space; it might, for all they knew with the instruments at their command, extend vaguely into infinity."

"But what," breathed Vic, frowning painfully with unaccustomed thought, "did that mean as far as the electron was concerned?"

"Just this. That there was no determinate position for the electron. Somewhere within the vague and trailing series of waves the electron existed. Its exact position was purely a probability, and 'X' in the equation of the waves. Within that area it was equally likely to be anywhere."

"That much I knew also," Sem admitted.

"Heisenberg went a step farther," Fran said. "He elucidated the Principle of Indeterminacy. That it was impossible to know both position and velocity of an electron at a given instant. Measure one and the other changes instantaneously. Since both factors are required for accurate determination, we were, it was said, forever debarred from exact statement of cause and effect in the microüniverse.

Sem said placidly. "Well, what harm is there in that? For all practical purposes, the probability that an electron is within a given area of waves is sufficiently limited by the fact that the circumscribed area itself is so inconceivably small. It acts for our Machines as if it were a point."

"Exactly," Fran exclaimed, eyes snapping. "That's why nothing more was done about it. It was all pure theory. But I have changed that."

Sem stared at him. "How?"

Fran's voice vibrated with pride. He looked lovingly at the transparent globe. "I have," he said very slowly and distinctly, "immeasurably enlarged the limiting area of an electron wave."

Sem shook his head dazedly. He did not understand. Vic certainly did not. He said so vehemently. His head was aching.

"Hold this fact," Fran explained patiently. "An electron is merely something somewhere within a series of waves; these waves have no ascertainable limits, but the probability of the electron's existence so far has been limited to a tiny, circumscribed area."

"Continue," Sem ordered, knitting his brows.

"Well, with this Machine, I have enlarged that area of waves. Instead of trailing out into vagueness, I have continued them at almost a dead-level strain for tremendous distances. How far, I myself don't know yet. It might be a yard, it might be millions of miles."

Vic grasped at that eagerly, proud of the fact that he had followed. "That means then that the electron, the basis of matter, might be anywhere in that extended area; that its presence in the spot where it is visible in the mass is only a probability."

"Exactly."

Sem, however, caught the implications like a blow in the face. His smooth, ruddy features went pale.

"If that is true," he almost quavered, "the present position of every particle of matter in the universe would become only a mere probability. The probability that I, as an aggregation of electrons, am here in this *vista* might yield the very next instant to an equal probability that I am somewhere else within that enlarged area of wave trains."

"You have grasped it perfectly, Sem 15," Fran cried delightedly. "I committed no error in taking you into my confidence."

BUT Sem did not hear him. His eyes were fixed with a strange intentness on that innocent-looking globe. He saw the filaments, the receiving cells that tapped the unlimited power of the Central Machines, and a queer series of grids that looked like a new type of transformer.

"It *is* a transformer," said Fran, reading his thoughts correctly. "That is the heart of the instrument. It acts directly on the subetherial waves of matter. It is highly selective in principle. I have set it for maximum at the energy state of the densest part of the electron waves. Therefore it reacts with the gradually weakening waves as they shade off into infinity, and steps them up in intensity until they have achieved the maximum of the core."

Sem 15's face grew hard. A long-forgotten vigor infused his limbs. He took a quick step forward. His clenched fist raised.

Fran cried out sharply. He twitched in frenzied haste, thrust his vanes into a whirring glide. But already he knew, with a sickening sensation in the pit of his stomach, that he would be too late. He had been far back, off his guard. He had never dreamed——

Vic 21 was a blur of emotions. Never after could he determine what it was that made him do the incredible thing he did. Perhaps it was a latent instinct out of the distant reaches of time; perhaps it was a strangely novel access of loyalty to his friend; perhaps, somewhere in his genes, unknown to the Mating Cells, had lurked a curious adventurous streak—— In any event he sprang, heaved Sem's down-descending fist aside, sent the patriarch sprawling with all the strength of his slender body.

For a small instant he stood panting, dizzy, filled with strange, ineluctable emotions that were somehow thrilling. The forgotten joy of conflict, of body hurtling into body. Then Fran, face drawn and white, flashed by, dead-stopped before his precious globe. That fragile bubble crystal, which Sem had attempted to smash, to rip tubes and strands and transformer into irremediable ruin. Delicate apparatus that had taken two years to complete.

Sem was slowly, painfully dragging himself to his feet. His gravity-twisting apparatus had been smashed by his fall. A Tending Machine, its delicate impulses disturbed by the thud, by the cessation of vibrations from the vanes, floated into the room. Two supports jerked out, clasped gently around the old man, set him on his feet. A lever unfolded and unhooked the wrecked

cells. A message surged through the ether for new gravity vanes.

Fran breathed hard. "You—would have—smashed my invention?" he asked heavily.

Sem's eyes met Fran's squarely. There was no anger in them, no resentment; only sorrow and the shadow of disasters to come.

"Yes," he answered quietly. "I would have smashed it. And I beg you, Fran 19, to do what I was prevented from doing."

A tremor rippled over Fran. "Never," he cried.

"You must," Sem insisted. "I too was once a youth, with youthful ideas and follies. I too rebelled at what seemed the dreadful monotony of the years that spread before me like a lusterless carpet. I too sought knowledge beyond the Machines; but I stopped in time. Now I am older, with more wisdom. Our life is placid; it is uneventful. Each day is like the last, each century indistinguishable from the others. But that is the inevitable concomitant of perfected civilization."

A Repair Machine soared squatly into the room. Folded vanes slid out of an underhanging rack; jointed metal arms hooked them into place on Sem's shoulders. Then it was gone, with the noiseless speed that characterized all the Machines. Sem did not even seem to notice.

His voice rose to unwonted passion. "What more can we desire? Shelter? We have it. Food? At the asking. Leisure? All our time. Luxuries? Name any desire and the Machines will gratify it. Everything that our uncivilized, barbarous ancestors yearned for and deemed unachievable. They who worked by the sweat of their brows and the wearied straining of their backs for a hundredth of what we possess to-day without effort; who lived in a world of suffering and disease and torture, who died before they had lived, who agonized for what they never attained, who were filled with vile thoughts and viler emotions—hate, envy, lust, greed—terrible things that you can never fully appreciate.

"Wars there were, in which man slew man and laughed at him in the doing, vast cataclysms of nature which crushed him, pounded him to pieces. Hunger assailed his wretched stomach, thirst his soul. Now"—Sem's voice took on a whispered longing"—we have peace, comfort, order, security."

FRAN was not moved, however. "That's just it, Sem 15. We have—everything. Everything—and nothing. We have physical comforts—a superfluity of them—and they are meaningless. Life has become a gray blank. We are dead—and do not know it. We are helpless wards of the Machines. We are their slaves. Without them we die. What profit is there, what incentive remains for us? Life is a struggle, a continual striving for something higher, nobler. Evolution taught us that; without that constant struggle we would still be slimy bits of protoplasm crawling along a slimy shore. We have reached the peaks of civilization, and are frustrated.

"There is no other way but down. With all our perfect, too-perfect state, we are immeasurably inferior to that brutal, lustful, bloodthirsty primitive you have depicted. He at least strove upward and onward, groping in his dim way for something higher, something just beyond his reach. When he starved, he lived; when he struggled with a hostile nature for the bare means of subsistence, he lived. When his few years were over, he died, but not in vain. The wine of life had been in his veins; his offspring groped still farther. And that, Sem 15, is what I intend to introduce into the world again."

"It is back to the brute," Sem cried in shaken tones.

"No," Fran exulted. "It is a breaking of our chains. Chance, the ruling, benevolent spirit of the universe, which we have unwisely eliminated, will once more come into its own." He swung his hand in a wide gesture toward the crystal sphere. "This—this will do it. Electrons, protons, neutrons, positrons, matter of which they are component parts, will widen their range of probability. They may be here, they may be there. No one will know; no one, not even the Statistics Machine, will be able to calculate their whereabouts. No longer will life be safe, sane and monotonous; the future, the present, perhaps the past, will be totally unpredictable, obeying no laws except those of chance; wildly illogical, dangerous.

"Thereby will mankind regain his rightful heritage. Nature will once more prove inimical, to be breasted, fought, conquered. Strange and terrible combinations will lurk in every corner; death will be part of our daily burden. Man will live dangerously, die gloriously. It is worth it."

Vic 21 shrank back half afraid of this stranger who had been his friend. He shrank, yet he was fascinated. Fire surged through his veins, made his heart pound with breathless emotion. Sem 15 seemed suddenly a shrunken old man. His thousand years were an insupportable weight. He bowed his head in resignation. "So be it," he mumbled.

"Back! Both of you!" Fran said. "I accept full responsibility for what I am about to do. There are two stages possible. The first affects only a radius of ten feet around the Machine. The second"—he shrugged his shoulders slightly, "the *vista*, the Sector, the earth, the universe perhaps—I do not know. I shall first experiment upon myself."

They moved slowly out of the charmed circle, staring, finding breathing suddenly uncomfortable. That crystal hollow with the shining metal within seemed a thing of dread, ominous in its very quiescence. Fran 19 made a queer, stiff little gesture of farewell. He did not use the greeting signal. Then his long fingers, now steady, closed on the knob, twisted.

Blue flame sheeted through the filaments. A metal governor bobbed up and down. Tiny balls whirled in smooth, noiseless revolutions. A hissing, crackling sound. The pungent odor of ozone. Involuntarily, Vic 21 thrust a slim arm over his head, as if to ward off a blow. Fran dropped nerveless fingers to his side. His body was tense, rigid. His face was white with agonized strain. That very instant he might whiff into atomic ruin.

The blue flame continued to flare, the balls to revolve, the governor to bob. Seconds passed, minutes. Nothing happened. No sign of any change, no sign of anything abnormal. Fran's tight fists slowly opened. Bewilderment crept into his eyes. Vic let his shielding arm down. Sem straightened a bit; a thin smile played around his half-hidden lips.

Fran saw that smile. A new emotion surged through him. The fear of ridicule. Anger too—at this preposterous Machine he had toiled over.

"You wait," he said thickly. "The Machine's all right. It's just—it's just the limits I tried to place on it. If I open her wide, as far as she will go——"

He turned the second knob. His voice held a confident ring, but inwardly he knew that it was a failure. It would not, could not work.

A little brighter flare, a tense surge of power that set every nerve tingling. But that was all. Sem said almost kindly: "Turn it off, Fran. The frontiers of science are still closed. It is better so."

Fran groped blindly with both hands. The hot tears scalded his eyes. He was crying with shame and humiliation. Something man hadn't done for cen-

turies. That look in Vic's eyes—of scorn, of—— His fingers reached for the knob.

IV.

THE HISSING, crackling sound cut off sharply. The blue glow blanked out with startling suddenness. Fran's hand went forward, forward, and met nothing. His eyes were still blurred with unaccustomed tears. But behind him, from Sem and Vic, came quick, frightened cries.

Fran straightened unsteadily, wiped his vision clear with the soft synthetic stuff of his tunic. He spun around in surprise, raked the room with wide-open eyes.

"My Machine!" he demanded thickly. "Where is it?" Vic was up against the farther wall, crouching, panting.

"It was there," he screamed, "right under our eyes. Then—then—it seemed to puff out of existence."

They searched then. But nowhere was there any sign or mark of the Machine. It was as though it had never been, as if the entire affair had been a dream, a hallucination from which they had just awakened. Even the metal cradle that had held the globe rigid and firm was gone.

Sem 15 raised a patriarchal arm, rested it on Fran's trembling shoulder.

"Fran 19," he said with respect, "you are a mere youth, but you have widened the boundaries of knowledge; you have done what you set out to do."

Fran lifted his head incredulously. "You mean—you think——" He gasped.

"I *know*," the old man said. "Your Machine worked. It enlarged the wave areas of electrons. It created new probabilities of the positions of those electrons."

Fran was shaking. His thoughts were still not coherent. "Then what——"

"Just this," Sem interrupted. "For some reason, as yet unknown, the Machine acted only on itself. It was its own waves of probability that were affected. The Machine has taken another position in that area. It may, as you remarked before, be just outside; it may be in a distant Sector; it may even be in another galaxy."

Involuntarily all three turned to the crystal walls of the *vista*. Everything was peaceful as before, as if no world-shaking experiment had just taken place. The tempered rays of the sun bathed the Sector in its uniform glow; a few inhabitants soared at different levels; far off, a Carrier Machine was bringing a cargo to the City of the Machines. Nothing else. No sign of the crystal sphere.

Sem spoke with measurable relief. "You have won, Fran, and I am glad." His halting voice deepened. "But I am more happy that it turned out the way it did. We have been saved from terrible catastrophe." He shuddered. "Who knows what might have happened?"

Vic said softly: "Forgive me, Fran, for doubting you. It—it was miraculous. You are a great man. But it is better so."

Fran's ego healed and expanded under their praise. It was good to hear such things. Shame sloughed off like an outworn garment. Now he could face his fellows proudly. He had accomplished the impossible. He had not been content with mere existence; he had toiled; he had achieved; more, he had suffered strange new emotions.

Aloud he said in a disappointed tone: "I am sorry it did not work the way it should. Perhaps a filament was bent and forced the step-up surge into a circumscribed circle." But inwardly he was very glad.

His eyes had been opened. That swift, unforeseen vanishment of the Machine had frightened him, left him trembling in every limb. Suppose the globe had worked as he had intended.

Suppose his waves of probability had extended to the outer reaches of space; suppose he had shifted without warning into the blazing maw of the sun, into the unutterable cold of interstellar emptiness. Suppose——

All his fine, glittering theories fell from him. He had confronted the inscrutable face of reality and he was afraid. Adventure, chance, glorious annihilation, struggle, suffering—empty phrases. He clung to the peace, safety and security of their uneventful existence with a certain desperation. He had been saved from himself.

He sank gratefully upon a couch. His voice was a monosyllabic whisper. He sighed relief.

"Warm—safe!" he muttered drowsily and fell asleep. So did Sem and Vic. They were exhausted. The Feeding Machines came and injected warm nutriment. They did not hear or feel. The Tending Machines transported them gently into the *quiet*.

But out in space, five hundred miles above the surface of the earth, a new planetoid whirled in ceaseless flight. A tiny crystal sphere, holding in its hollow shell strange metal parts that glowed and revolved and bobbed. And sardonic laughter filled the universe.

THE THREE who had seen the Orb of Indeterminacy vanish came out of the *quiet*. The even tenor of existence flowed slowly on. Sem 15 and Vic 21 once more rested on their couches as Guardians of the Machines. Fran brooded in his *vista*, oddly uneasy. A vague restlessness pervaded him. Nothing had happened, nothing could happen now. Yet, somehow, his inner being had been disrupted. Perhaps, he thought, it would have been better if——

It was a small thing that happened first, a most unimportant event. A Cargo Machine from the mines of Sector 112 was two ounces shy in its hundred-ton load of bauxite. The Atom Smasher jerked momentarily in the smooth surge of its operation. It was geared to exact weights. But almost immediately the Compensator made the necessary adjustments, and the swift routine went on.

Two ounces in a hundred tons. An inconsiderable amount. Perhaps the Loading Machine at the mine had erred; perhaps particles of the crushed ore had spilled. Nothing at all. But such a discrepancy had never happened before.

The next item was more disturbing. Sector 87 reported the sudden, fantastic appearance of a human being within the very wall of a *vista*. Like a fly immersed in a lump of amber. His limbs were distorted, crushed. His face was a pulped agony. He was dead. The immensely strong vita-crystal showed a long, irregular crack, a slight bulging, as if enormous outward pressure had been exerted, as if two bodies had attempted to occupy the same space at once.

The Repair Machines hastened to the spot, excised the shattered stranger, rebuilt the wall to its pristine purity. But not before it had been seen by a passing human. Within seconds the Sector had disgorged its inhabitants. They swarmed to the disturbance; they chattered with tongues that were rusty from disuse; their cheeks flushed and their eyes sparkled. An unprecedented thing had occurred.

Almost at the same time a Tending Machine from Sector 32 reported in passionless pulses of ether to the Communications Board the inexplicable disappearance of its ward, Wil 16.

As the televised representation of the tragedy flashed on the screen of the Board, Vic twitched so violently that his Gravity Vanes thrust him almost to the dome.

"Great Heavens, Sem 15," he gasped on his hurried return, "Fran's invention did that!"

A little shiver passed over Sem; then

his face was calm and immovable as before.

"Nonsense," he said slowly. "The sphere removed itself; it had no effect on anything outside. What has happened is an accident, some tiny filament that went wrong in a Gravity Cell unit and smashed the poor fellow against a *vista*. The Statistics Machine will make the necessary adjustments." But there was a strained unease in his eyes as he settled back to the couch.

Integrations poured out of the Calculator, tremendous mathematical phrases to take up the load of the new order of events, to equate them into the scheme of things. But nothing could be done. For simultaneously, overwhelmingly, from the far corners of the earth, came new reports. Sector after Sector flashed uncanny occurrences.

Then, suddenly, disaster struck home. Half a *vista* materialized in the clear atmosphere high over the City of the Machines, hung in momentary suspension, then fell with constantly accelerating force to the ground.

Vic uttered a hoarse cry of warning. The recumbent Guardians seemed paralyzed with fear. They gaped upward, unstirring. But Sem 15 had seen, and acted. The inertia of a thousand years swept off him like a cloak. His vanes catapulted him from his seat, sent him with tremendous acceleration straight for the huge round of the Gravity Distortor. This was the Machine that deflected the lines of gravity around the city when Cargo Flyers approached, routed them within range of the Magnetic Clamps. But now it was silent, unstirring even as the Guardians. Only through an impulse-beat from the swift-moving Cargo Flyer could it spring into automatic action.

Sem's hand clutched fiercely at the manual control. He yanked it down with a quick thrust. Already the down-rushing segment of building was almost upon the crystalline dome of the City. Tiny dots sprang away from its sides, darted swiftly through the air. Closer, closer, hurtled the crashing destruction. It filled the sky with its smooth-shorn section; it blazed with the friction of its passage. Contact, and the City with all its Machines, its human Guardians, would be pulverized into primal atoms.

Sem gave a great groan. He had been too late. Involuntarily he closed his eyes. There was a thin, scraping sound. Then a tremendous crash. The world was full of noise and confusion.

Shrill screams, then—silence. Sem opened his eyes unbelievingly. He was safe. So were the others. Outside, a blaze leaped sky-high, fell back. A long grooved scar showed over the crystal dome, where the falling *vista* had ploughed its way in the sudden swerve of deflected gravity. The Gravity Distorter had worked. Not so the Magnetic Plates. The momentum had been far too great for their calculated power.

Vic 21 was somehow at Sem's side. His body trembled as with ague, but his eyes were shining.

"Sem 15," he cried, "you are a hero."

Sem felt suddenly weak. He sank down on a convenient couch. But the blood raced furiously in his veins. His temples throbbed. The world was askew; danger had shown its dreadful face and barely been averted; peace and safety were forever gone; death might inclose him any moment; outside men had fallen to flaming annihilation. Yet somehow his blood sang a strange, exultant refrain. He took a deep breath. Even the air seemed more vigorous. He had *lived* this one fierce moment. He had not known life before.

He bounded up from his couch of ease. Contempt flared in his eyes at those other elderly Guardians, younger all than he. Some had fainted; others were fear-bound to their couches. He was a different breed.

"Come, Vic 21," he said crisply, with new-found authority. "We are going

Fran cried out sharply as Sem raised his fist. He twitched in frenzied haste, but already he knew he would be too late——

to see Fran 19. There is no question that his Orb of Indeterminacy is functioning."

The youth followed with a new meekness. Discipline, authority, obedience had been reborn into the world!

FRAN 19 listened to their excited accounts with a deepening pallor. He had loosed this terrible engine upon the world; his was the blame. Already thousands had been crushed out of existence. The reports were accelerating now. Holes had yawned in the earth; cubic miles of ocean had overwhelmed

Vic 21 was a blur of emotions. Never after could he determine what it was that made him do it! He sprang, heaved Sem's fist aside, sent the patriarch sprawling.

all in their path in the interior prairies, on the high plateaus of what had once been the Gobi. Whole Sectors had been wiped out of existence, gone no one knew where.

The earth heaved and crumpled as massed matter assumed new positions of probability which coincided with still stable configurations deep within its bowels. Earthquakes spread endless destruction. Loose, masterless electrons shifted their probabilities in undreamed-of trillions of trillions, let loose X rays,

gamma rays, alpha rays, cosmic radiations, upon a groaning, suffering world.

The blanket of ionization was pierced in a hundred places. Winds sprang up, grew to hurricanes. Rain fell, sleet howled, snow came in thick, mantling drifts. The Weather Machines battled valiantly, but some had smashed, others had vanished. The unleashed forces of nature proved irresistible.

"We've got to find my Machine," Fran said with despairing determination.

"How?" Vic asked plaintively. He shivered in his thin synthetic stuffs. A cold rain lashed interminably against the vita-crystal walls. Clouds scudded over a furious sky. A vital part of the Sector's Weather Machine had disappeared. The Repair Machines were tirelessly at work to bridge the gap, but it would take at least a day.

Fran shook his head. "I don't know how—just yet. But there must be a way."

Sem 15's voice was a gusty bellow. His great wide beard whipped around his glowing features. He stood with firm legs spraddled. He did not seem to mind the cold, the damp.

"You'll do nothing of the kind," he roared. "You were right, Fran 19, and I was wrong. You have worked a miracle. This is life!" He tossed his arms wide. "This is living! Struggle, violence, man against nature. Who knows what comes next, who cares? One day like this is worth a hundred thousand of slow rot. Bah!" He spat gustily on the polished floor.

Then the building heaved violently beneath them. The heavens seemed to fall. They fell flat on their faces.

When they dragged themselves painfully to their feet, all was deathly silence. Even the rain had stopped. A strangely brilliant sun, untempered, unshorn, shone mockingly through a rift in ragged, fleeing storm clouds.

"What—what happened?" Vic whispered painfully.

Fran helped Sem to his feet. Blood streamed from a gash in his forehead. He wriggled his shoulders. Nothing. He was rooted to the floor.

"Try your Gravity Cells," he said quickly.

They did. Nothing again. A Tending Machine wabbled crazily in a corner, rolled to a dead stop.

"I think," he said, very slowly and very distinctly, "that something has destroyed the City of the Machines. There is no power."

They stared at each other with dull, drawn faces. No power! That meant no Tending Machines, no Repairs, no food, no locomotion, no means of communication, no civilization. Fran's wild dreams had come to fruition with a vengeance.

"Now, do you see, Sem 15," he asked softly, "why it is imperative to find the Orb?"

The patriarch shook the blood in a spray from his matted locks. He seemed like some Neanderthaler from the days when the earth was young.

"I do not," he declared defiantly. He shook his fist at the heavens. "I am not afraid," he shouted. "Bring on your probabilities; bring on the unpredictable. Ha! ha! I am as incalculable as you all. While I'm alive, while I'm here, I'll seek no favors. I'll wrest what I want from an unwilling world."

Like a prophet of old, like that man immortalized in the long-forgotten song, his head was bloodied, but unbowed. Perhaps he was a little mad just then.

Fran watched him in half admiration, but he saw clearly what had to be done. Instinctively he took command.

"The first thing to do is to determine what happened to the City of Machines; whether there is any possibility of repairs or salvage. Vic, Sem, follow me."

Vic looked bewildered, but went

obediently. He was a follower, not a leader. Sem grumbled in his beard, and went along.

V.

OUTSIDE everything was chaos. All landmarks were gone. Strange *vistas* lurched on their sides, or emerged, half buried, from the ground in which they had materialized. Bottomless pits yawned underfoot; great fissures ran diagonally through earth and vita-crystal. Bodies lay in profusion. Remembered faces, faces never before seen, stared sightlessly up at them. Others resembled nothing at all, mere shapeless lumps that had dropped from tremendous heights.

Fran shuddered and stumbled on. Vic was suddenly sick. But Sem did not seem to see. Death and destruction were inevitable concomitants of the change.

Walking was wearisome to their unaccustomed feet. Even to Fran, who had practiced secretly in the days of his revolt. For one thing the ground was a bumpy, hummocky mass. For another, the rain water swirled around their legs, poured in sheeted waterfalls into the depthless chasms beneath. And the City of the Machines was a good four miles distant.

As they made a long detour to avoid a fissure and climbed over the crumpled remains of a *vista,* something darted at them. It had been one with the shadows, flattened stealthily against the wall. Now it was a crashing thunderbolt. Straight for Vic it hurled, a long, quavering howl in its throat.

There was a startled cry from the youth. He tried to swerve. But it was too late. The apparition fastened on him with a hideous cry of triumph. A mouth gaped wide, teeth flashed white in the sunlight, dipped eagerly for Vic's throat.

Fran came out of his daze. He leaped forward. His fist swung out, smashed with a satisfying thud into yielding flesh. The apparition howled with pain. He dropped the half-fainting youth, glared fiercely at his attacker, and darted back into the shadows from which he had come.

Fran caught Vic as he swayed. Sem glowered after the vanished man, shouted strange words that sounded like ancient imprecations.

"You all right, Vic?" Fran asked anxiously.

The youth shuddered, smiled faintly. "Quite. But what—what was that?"

"That," said Fran gravely, "was Char 17. Once a civilized man. Now he is a beast of prey, seeking the food the Tending Machines can no longer give him."

"But I—I didn't have any," Vic protested.

"Human flesh," Fran said, "is food. Long, long ago there were men who ate and found it very good."

They continued in silence. Even Sem seemed shaken by that episode. Bars of metal, wrenched from the lever supports of wrecked Machines, were in their hands. They met other prowlers, who fled like ancient wolves at their determined approach, at the primitive but effective weapons they held.

The dead were everywhere, but so were those who were still alive. Some, unhurt, not yet ghouls and cannibals, lay where they were. Unaccustomed to physical movements, unused to decisive processes of thought, they seemed sunk in deathlike stupor. Fran moved toward them with pitying gestures. They needed help. They would starve to death in their helplessness, if the prowlers did not get to them first.

"Let them alone," Sem objected. "They are not good for anything. They are weaklings who will never survive the new conditions. Better they should die now than drag us down with them."

It was pitiful, but Sem was right. This new world of theirs was a hard,

cruel one. Only the strong, the determined, could survive. Food, shelter, clothing, would be at a premium. The weaklings would impede them in the struggle.

So, with the stirrings of humanitarian impulses sternly repressed, they went on. But there were other men, men in whom already the new conditions had brought the latent iron to the surface. Men who did not slink or prowl, who did not weep and bemoan their fate, but toiled purposefully at the wreckage, succoring the wounded, seeking the Machines, trying clumsily to make them work.

These the little party hailed. These were the men of whom the new world would be fashioned. They fell in behind, a steadily growing horde, hasty weapons in hand, streaming toward the silent City of the Machines.

SOMETHING sang in Fran's bosom, something exulted. If only the devilish Orb he had invented were smashed, fate might still prove not too unkind.

"Did you notice," he told Sem abruptly, "that there have been no further shifts of probability since that last great crash?"

It was true. All the strange transmigrations had ceased. Matter once more seemed immutably rooted, subject to immutable laws. The First Phase had passed. But Fran did not know it then.

There were almost a hundred men in the band that followed Fran by the time they reached the City. The last chasm had been skirted, the last upheaval laboriously surmounted. As one man they stopped, aghast at what they saw. Whatever hopes they might have cherished were dashed to the ground.

The City of the Machines was an irremediable chaos. A huge hole went down half a hundred miles into the very bowels of the earth. Machines, Tenders, Calculators, Statistical Integrators, had vanished into no one knew what realm of probability along with the hundreds of thousands of tons of soil and underlying rock. Only the Central Power Cylinder remained, flaunting its smooth metallic slenderness on the very edge of the tremendous deep. Nothing else.

The weaker in the party sank hopelessly to the ground. Tear glands sent strange watery fluids trickling down their cheeks. What could they do; where could they turn? The Machines had tended them for thousands of years; now that aid was withdrawn. A new and raw world faced them, a world that cared not whether they lived or died, whether they fed or starved. Even Fran was stunned for the moment. He had not expected quite such a cataclysmic disaster.

But a curious sense of responsibility stirred him to action. These men, and women who were almost like men, were his wards now, even as they had once been wards of the Machines. They looked to him for guidance, for leadership. It would never do to show that he was afraid.

Therefore, he said cheerfully: "We are very fortunate. The Power Cylinder is still intact. We may be able to start it operating again. If we can, there are plenty of Machines lying around in the wreckage that no doubt will work."

Thus, with words of encouragement, with face that was gay and open, he lashed them on to further struggle. Sem thundered and exhorted and was a tower of strength. Finally, somewhat red and shamefaced, the easy despairers tottered to their feet, took their places in the long line that wended over the broken terrain toward the still-standing Cylinder.

"Keep away from that hole," Fran cried sharply. But it was too late. One man, shambling wearily along, had slipped on loose rubble. Before their

horrified eyes he shot over the smooth knife edge, went tumbling and gyrating into the terrific cavity. For long minutes they heard his echoing, frantic screams as he went down, down. Finally there were no more.

The band stared at each other with ashen-white faces, and went on. There was no time now for vain regrets or lengthy mournings. Life faced them. Life must be conquered.

Fran, Sem and Vic inspected the Power Cylinder, the Communications Board that went around it in a spiral platform. They had been Guardians, hence they knew something of the mechanism. The rest huddled like sheep beneath, waiting for the leaders to emerge. On their report rested their chances of survival. Already they were hungry and cold, and these were at once novel and terrifying sensations.

Minutes passed, hours, and still no word. Then suddenly, high up, like three tiny dolls, they appeared. Fran's hand went out in a wide gesture.

"Friends," he shouted, "the Cylinder can be repaired. It will take days of work, but determined men can do it. Also, there is a storage tank of food intact, enough to last a month. After that——"

But the rest of his speech was lost in the great cheer that went up. Confidence surged through them, a feeling of strength and mastery. Shoulders went back, eyes snapped with alertness, power tensed their soft muscles. They laughed and jested as men had not laughed and jested since the advent of the Machine Cities.

It took them a grueling month of work. They were unaccustomed to their tasks; muscles grew slowly hard while blisters yielded plentiful crops. Missing parts had to be searched for among the débris of former Machines. Discipline had to be initiated, responsibilities divided. Guards were set, and a code of signals evolved. For outside humanity—those who had survived the great catastrophe—had reverted to primitive savagery. Normal food had long since given out. There was only one supply left to the half-mad, beast-like creatures—the flesh of living men.

Time and again the little band heard the code alarm, dropped all tasks, snatched up the metals bars that never left their sides, and surged in disciplined ranks to repel the swarms of shrieking, maddened beings who clawed at them with taloned fingers. Always they beat them back, but not without losses. However, there were additions also. Weakened but still civilized humans who managed to elude the roving hordes came to join this last stand of the human race.

BY THE END of the month food was perilously low. The newcomers were an unexpected drain. Yet they were not refused admittance. Sem attempted to argue the matter, but Fran was very firm, and Vic backed him up.

"We live or die together. They have shown their worth and stamina by not succumbing to the frightful conditions outside. They need us, and we need them, and more like them, if we are to conquer our new world."

At last, with the precious ichor, which was their only known supply of food, down to the last thin lining of the Storage Tank, Fran dropped a plate of metal into place, bolted it clumsily to the otherwise smooth round of the Cylinder.

Vic, watching, shouted exultantly. The workers dropped everything, swarmed cheering and laughing and crying into the room. The job was finished.

Fran swayed with weariness. The back of a dirty hand swept salt sweat from a smudgy brow. Callouses and blisters covered his palms. He grinned faintly. "Don't cheer yet, boys. It may not work."

"It must," Sem shouted, capering like

a youngster of twenty instead of a patriarch of over a thousand.

Fran walked steadily to the manual control. There was a sense of fate, of doom, in his firm, resilient step. The confused crying ceased.

For an imperceptible second Fran's fingers hesitated. Now he was afraid, deathly afraid. His fingers firmed, he closed his eyes and pulled.

What was that little purring sound? A veritable frenzy overtook the devoted band of humans. They shouted, they sang, they danced insanely. Life before the debacle had never held anything so heady, so thrilling.

The Power Cylinder was operating! The last delivered load of bauxite fed smoothly into the one remaining Atom Smasher, there to be converted in a blast of annihilation into power. The tremendous energy flowed into the huge Cylinder, flashed in blue flares in the faceted ball at the top of the column. Repair Machines they had salvaged and dragged with aching shoulders to the Machine City galvanized into life, floated like worker bees to the great Queen Cell. Patched, clumsy repairs the humans had made were transformed to perfect adjustments. Gravity Cells lifted at the slightest twitch.

The first and most vital function to which they put the resurrected Power was the synthesis of food. Repairing and Building Machines set to work. Within two days a Food Synthesis Machine was completed; within three the first precious drops of the nutrient liquid flowed into the Storage Tanks.

"We've won back to where we were," Fran told his friends with quiet exultation a month later. Already the Machine City was building back to its former proud estate. More and more humans came in, with dreadful tales of unbelievable conditions outside. But within was security, peace, and a growing population. Already, in his mind's eye, Fran envisaged the world recovered with Machine Cities, using their own as a base, and Sectors of *vistas* rising phœnixlike from the débris of the former civilization.

Sem grunted. He had been oddly morose for over a week.

"What's the matter?" Fran asked in some surprise.

"Matter enough," the patriarch retorted. "Is that what we suffered for, struggled, conquered? To restore the deathlike dullness and inanity of a world that was well lost?"

"But——" Fran started to protest.

"Look at them now," Sem interrupted tensely. He seized his more youthful friend by the arm, dragged him out on a balcony of the new City. Sem had smashed his vanes with a violent gesture the week before. He had discovered his legs, he averred, and he intended to keep on using them.

Fran looked down on the great temporary communal hall. The Sector was still in the process of rebuilding.

THE WHOLE community, some five hundred in all, was congregated in the spacious expanse. They reclined on couches, languidly, inertly, scarcely deigning to lift their heads at the appearance of their leaders. Feeding Machines floated among them, injecting nutriment into their veins; Tending Machines supplied their slightest unuttered want.

"Look at them," Sem thundered with fierce contempt. "A month ago they were alive, vigorous, masters of their fates. Now—bah!—they have slipped back to their old selves, weak, colorless nonentities babied by the Machines. A month ago, when the Cell-Mating Machines no longer existed, men and women drew apart, looked at each other with new eyes, new comradeship. Now they are indifferently one, sexless. We have labored mightily and brought forth a pallid simulacrum of all you revolted against."

Fran knit his brows. He had spent some anxious moments himself over this easy sliding back into old grooves, but —— "There's nothing we can do about it, Sem," he submitted.

Sem lowered his voice to a tense whisper. His eyes blazed fanatically. "Yes, there is. Smash the Machines. This time thoroughly, so they can never be rebuilt."

Fran shivered. "Then we'd all die," he protested. "There would be no food, no——"

"Natural food once grew in the bosom of the earth," Sem pointed out.

"There is none now," Fran said. "No, Sem, I'm afraid we must continue."

And for another month they did. The Sector was finished, men reclined on their private couches now as of old. The Machines did all the work. New Machine Cities sprang up in a steadily widening territory, powered as yet from the Great Central Cylinder. Except for certain tremendous chasms in the ground, it was hard to believe that anything had happened. The great disaster faded from minds that held less and less of thought. Why think when the Machines did it so much better?

By this time Fran had almost ceased to think of his vanished Orb of Probability, the Machine which had started it all. He assumed, and plausibly, that it had destroyed itself in that last tremendous crash. Once again, the world was fixed, immutable; and electrons were held within inconceivably small areas of indeterminacy.

But unknown to him, to anyone, a small crystal sphere swung around the earth in planetary flight, five hundred miles out in space. Cold and lifeless it was during the middle period when the Central Cylinder had blanked out of commission. The power that fed its tubes and filaments and transformers had come from the faceted balls at the top of the tall metal column.

Then the Cylinder was repaired, and started anew. Once more waves surged out into the ether, even into outer space. Once more the rushing energy impinged on the delicate apparatus, sent it into ceaseless motion.

But something had happened. Some small imperceptible change in the character of the waves perhaps, in their lengths and frequency. Therefore, when the Orb of Probability functioned again, it was on an entirely new principle, something that Fran in his experiments had never anticipated, had never believed possible even in his wildest theorizings.

VI.

IT WAS almost two months after that last discussion with Sem that the Second Phase brought new and undreamed-of disaster to a world that had relapsed into its old patterns of life.

Fran noticed it first. He was talking to Sem in Sem's *vista*. The patriarch was gesticulating, walking back and forth, harping on his old grievance. His long beard swept wildly behind him, his hair in an uncut tangle. Fran rested delicately on a couch, a trifle weary. He who had once been alone in his revolt, now floated in a pleasant enervation of relaxed effort. It was good; it was normal; it was civilized.

"I like it this way," he said a bit defiantly. He had not quite stilled the last qualms of the old stirring. Subconsciously he realized that Sem was right.

The old man swerved on him with a bull-like roar. It sounded terribly loud to Fran's newly fastidious ears. Then, abruptly, it cut off.

Fran turned his head languidly, stared, and jumped violently to his feet. Sem was no longer in the room. That is, not the Sem he knew. There was a man, it was true, in exactly the same spot where the indignant patriarch had

stood, but—but—he was a beardless youth, with smooth, delicate features, a mere boy not over fifty.

"Why—where—what——" He spluttered. "Sem, where are you?" he shouted, fear clutching at his heart. Had that long-vanished Orb started functioning again, transported Sem to another level of probability?

The stranger stood as one in a daze, as one emerging from a clogging dream. His eyes lifted with a puzzled expression to Fran; he did not know him.

"Why," he said haltingly, in a thin, fluted voice, "I am Sem—Sem 15. But who are you, and what is this place?"

Fran fell back a step, groaned. Was he mad? Was this beardless unknown who had appeared unaccountably in the patriarch's place also mad? It was impossible; it was——

He came closer. Something in that tone, something in the line of those delicate features—— He clapped his hand to a fevered brow, twitched shoulders and soared out into the Sector. The youth who had called himself Sem 15 watched him go with bewildered amazement. He had not oriented himself yet.

Fran went headlong for Vic 21's *vista*. Fear fled with him, a terrible clutching fear of this new and more dreadful manifestation. Had anything happened to Vic, too?

But Vic 21 was still Vic 21. Thank heavens for that! The young man looked up slowly at his disordered friend.

"You look," he remarked placidly, unstirring, "as if you have seen a—what the primitives called a ghost."

"I have," Fran cried, and poured out his story. Sem 15 had vanished, yet Sem 15 was back there, in his *vista*. But a different, younger Sem; a Sem of almost a thousand years ago.

"I am not mad," Fran insisted. "I saw it with my own eyes. The features, a certain intonation in the voice, were the same. But he did not know me. Naturally"—he caught himself up at the new thought—"for I hadn't been born yet."

Vic smiled, a faintly irritating, superior smile. "You need your Tending Machine," he said.

Then everything seemed to fall away from them. Only the instinctive twitching of their shoulders and the spreading of their Gravity Vanes saved them from a fatal hundred-foot drop.

The *vista* had puffed out of existence; so had the surrounding buildings for a space of half a mile. They floated to an earth that was strange and unfamiliar. Far off they saw the normal *vistas* of the Sector, tall and crystalline; still farther off, the recently erected Machine City.

But around them was warm brown earth, thick with unknown smells. Tall grass, light yellow in color, and tasseled with queer, elongated seeds, waved in a billowing sea. Little brown bodies, seemingly alive, with long, bent-back ears, scattered fearfully from under their feet. And, strangest phenomenon of all, an outlandish Machine approached them with great noise and clatter. Before it the tall grass waved; behind it lay long, cut swaths. Two huge beasts, gray of body, pulled it with thudding hooves. A human being sat in an iron seat, made funny clucking noises to the beasts.

They saw each other simultaneously—the men of the 97th century, and the farmer man of the 19th century. The farmer yelled in fright, jumped off the mower, and ran as if he were being pursued by devils out of hell. The horses snorted and went clattering after him.

"What the——" Vic commenced. But he had no time to finish. Fran knew what had happened.

"Come," he shouted frantically, "to the City of the Machines! We must put a stop to this before it is too late."

Once more obedient, Vic followed.

At the Communications Board everything was chaos. Reports tumbled in from all over the earth. More ominous even, was the lack of reports from vast sections of the world. Everything was topsy-turvy, much more so than even during the First Phase.

Time had gone haywire!

HERE AND THERE, incalculably capricious, the 97th century had disappeared. Whole Sectors went into oblivion—the oblivion of nonbeing—and other times, other civilizations, sprang into their places.

Cities of the 51st century, crowded with people, juxtaposed in amazed contact with steamy jungles from which the dinosaur peered and Neanderthal man hunted with huge stone club.

Pickett led his gray wave in that last desperate charge at Gettysburg, only to halt in stunned bewilderment at the turreted walls of Carcassonne which had unaccountably veiled the blue line of Meade's army. Athenian orators found themselves addressing primordial slime in waveless seas; a 32nd-century dictator, holding powers of life and death over all the world, was suddenly alone on a featureless plain over which the wild hordes of Ghengis Khan were pelting.

Centuries, millennia, eons, were mingled in inextricable confusion. Even the future was there. Unimaginable beings, gracious and godlike, impassive even in this sudden wrench to their surroundings, floated next to shoreless seas of frozen ice, over which the sun, a dying shrunken ball, cast its last wan glow. The beginning of time, the end of time, stared at each other in equal incomprehension.

Only Fran 19 knew, there on that still secure plot of the 97th century, watching the welter of the inpouring reports, the sudden cessation from Sector after Sector.

His face was grim and lined. Vic asked anxiously: "What does it mean?"

"What I had forgotten. That time is a dimension even as the three we know of space. The electron, the proton, the rest of them, move in a time dimension as well as in spatial dimensions. Undoubtedly, time is also a wave of probability in which the electron exists. The Orb of Indeterminacy, which I thought was smashed, is somewhere, functioning again. Only this time it is enlarging the probability waves of the Time Dimension instead of space. As a result, matter is jumping from probability to probability in time, mixing all the ages, shifting eras——"

Vic's eyes popped at that. A new and fearful thought had just struck him.

"Suppose," he said, "this City of Machines shifts to another probability. Suppose we do."

"In that case we'd either be so far back as not to be alive yet, or so far ahead as to have been dead for centuries."

"For heavens' sake," Vic clamored, "do something about it!"

"I am," Fran retorted grimly. There was pain in his eyes, but also a new light that had been gone since the First Phase. "I am destroying the Central Power Cylinder, destroying it so thoroughly it will never be rebuilt."

Vic shrank back, alarmed. "Why?"

"Because the Orb of Indeterminacy has no power of its own. Wherever it is, it works only on the waves of energy sent out by our Machines. That was why, after the crash of the City, the First Phase stopped."

"But—but—we will starve again," Vic protested.

"No we won't," Fran retorted, queerly exultant. "That field in which we were dropped was a field of wheat from an earlier day. The animals that ran from under our feet were rabbits. Both were used for food long ago; we shall relearn to eat. Think of it, Vic," he cried. "Smash the Machines, stop the

Orb, bring back the old spirit of adventure, of struggle with nature that was so satisfying in those two months of the First Phase, now to be forever our heritage."

"And those other times that exist with ours, the civilizations, the people, the customs of other days and years?"

"They shall stay. Never in the history of the world has there been such a glorious chance. The map of time is outspread for us to read, to learn the wisdom of all the ages."

Fran sprang through the trembling Guardians, disappeared into the walls of the Cylinder. Vic held his breath. Any moment, before Fran could act, annihilation might be upon them. Outside, where the great cavity had yawned into the earth, something had happened. In its place stood a roaring, teeming city. Tall buildings of stone and steel soared in jumbled confusion. Subways grumbled underneath; automobiles, street cars, clanged slow progress through narrow streets black with hurrying people.

New York City in the 20th century!

Vic cried out. "Hurry, Fran!"

There was a grinding, rending smash. The shining Cylinder shook with inner vibrations. The faceted ball on the top went dark and lusterless. The Atom Smasher shuddered, stopped; Tending Machines fell heavily to the ground. Vic's Gravity Cell was dead. All power was gone!

Fran ran down the outer spiral passage. "It's done, Vic," he panted. "The Cylinder is a wreck of twisted parts. It can never be repaired." He stopped short, stared with avid eyes at the 20th-century city that blocked his view.

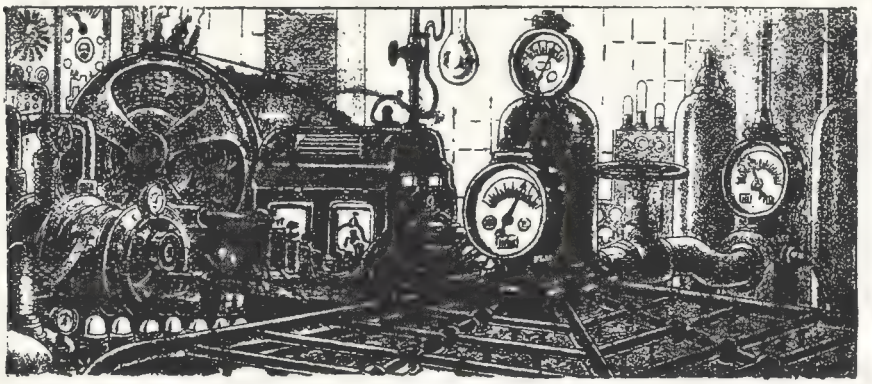
"Adventure!" he whispered to Vic. "In there, elsewhere, all over the world." He flung his arms wide, as if to drink in the wonder of it all.

"How about Sem?" asked Vic practically.

Fran's face clouded, lighted up again. "We'll find him," he shouted. "That youth of our own age whom we know and who doesn't know us. We'll explain it all to him. He'll understand. He'll be our friend again."

Together they went running to seek him out. They skirted the city in which traffic had stopped in sudden disorder, in which frightened people stared out at the silent City of the Machines of the 97th century. A new and unimaginable era had dawned for the world.

Overhead, five hundred miles out, a tiny crystal sphere rushed through space, round and round and round. Within its transparent depths were silence and blank death. Round and round and round, unknowing what it had done, what strange new world rotated beneath.



The raw meat goaded the thing to wild fury. The guns in the hands of the circle of detectives were futile as toys.

FOG

A story of medico-science

by C. C. Campbell

THE SUBJECT was staring up into the lights above him, shuddering, while the two doctors scrubbed themselves thoroughly with green soap and donned sterile clothing, masks and rubber gloves.

"You will please attend to the anæsthesia, Dr. Rollins," Dr. Cobb said, switching on the great operating lights. The seven bulbs were suspended so that no matter where the surgeon held his hand, there was no shadow cast.

Rollins placed the ether cone over the patient's face. There was a hiss of ether, oxygen and nitrous oxide mixing in a slight rush. The rubberized-leather bellows inflated and deflated rapidly, as the subject breathed powerfully. Six seconds later he was completely anæsthetized, and lay breathing deeply and evenly.

Immediately Cobb put on his thick glasses. With his weak old eyes close to the head of the patient, he cut through the skin of the scalp, just above the orbital ridge, back above the ears, and stopped at a point three inches apart just over the base of the skull. He flapped the scalp back to bare the bone. At each temple and the sides back of the ears he bored a hole. Then, from each hole he cut through the intervening bone until he connected the four holes, sawing regularly with a small blade attached to the frame of a surgical jig saw.

When there was danger of touching the brain, he drew out the saw and inserted his fingers in the two holes at the temples and jerked up sharply. The bone snapped at the sides and back; he used a bone clipper to cut the hanging edges. Rapidly, his old hands acting automatically, he spread bone wax over the cut surfaces of the skull, both on the head and on the part he held in his hand, to prevent excess bleeding from the bone, which would prevent rapid mending.

Now the pulsating, gray brain was exposed to his cold gaze. Beneath the colorless, gelatinlike covering, purple veins and bright-crimson arteries pulsed in time with the brain and heart.

He cut through the quivering, gelatinlike covering, consisting of three membranes—the *dura mater,* or outer membrane; the *arachnoid,* middle; and the *pia mater,* innermost layer.

As he cut, he waited for the spinal fluid that filled the spaces between the membranes, protecting the delicate brain from injury, to drain off. The three membranes he flapped back as he had flapped back the scalp.

The dull-gray brain continued to pulse steadily, in time with the heart. Its two hemispheres and eight of the lobes were clearly visible, the four other lobes hidden by the remainder of the skull.

His keen scalpel poised just over the two frontal lobes, near the fissure Sylvius.

With a deep groan, muffled by the ether cone, the subject tossed uneasily, as if some instinct had warned him to move. Rollins jumped away from the ether tank to pin him down. He was too late.

Before Cobb could pull his terrified hand away, the patient's head rearing in dumb agony, had hit the scalpel. Dr. Cobb jerked his hand away—too late.

They stared in horror at the severed lobes as the knife sheared through them and they dropped to the table. Cobb tore his eyes away from the terrible sight, gazed vacantly at Rollins for a moment, and watched the bellows in fascination. It deflated rapidly—filled again—slowly——

His hands flashed as he picked up a hypodermic of adrenaline and plunged it into the heart. For hours it seemed they stared in fear, until respiration gradually resumed its normal rate. Only then did they breathe naturally again and——

Rollins saw the old man's hands shaking tremulously. When he looked down, his own, which he could not feel, were shaking as badly. His heart beat wildly at a tremendous rate.

"He's done for, isn't he?" he asked softly, dreading the answer.

"Yes," Cobb nodded quietly. "Too bad, because I expected a lot from this experiment. But no man ever lived with his frontal lobes cut off."

"But he's breathing normally," Rollins pointed out.

Cobb shrugged. "What's the differ-

ence? He can't live. We can go on, though, just as if he were going to live."

THE GRAY LUMP of tissue lay inertly on the table, containing every impression and memory of the patient—the victim now. Rollins tore his eyes away from the morbid fascination and watched Cobb. He wandered absently from the operating table, hypodermic in hand, and searched vaguely over rows of bottles standing on the shelves against the wall. As if not certain which one he wanted, he picked one, almost at random it seemed, and charged his hypodermic.

"What's that?" Rollins asked.

Cobb looked up at him. "Pineal extract," he muttered.

"What're you going to do with it?"

Cobb walked over to the operating table, lecturing as he went. "Suppose I were to stimulate the pineal gland—what would happen? Nobody knows. But this much is believed: the pineal gland controls the racial memory of man; in other words the instincts. Now, with complete amnesia there is only loss of memory, but an attempt at ratiocination. With the instincts stimulated until they have gained complete control over the brain and body, we have a pure beast, an omnivorous brute, activated solely by instinct."

Rollins thought a moment. "What'd be the advantage of that?"

"Very little practical advantage," Cobb admitted. "But so very little is known about the functions of the brain—of the various portions that is—that the establishment of proof that the frontal lobes do control memory and the pineal gland the instincts, is vastly important both to surgery and psychology. It may be possible at some time, basing the experiment on the results of this one, to stimulate the racial memory, and even to divide it minutely into æons, centuries, or even—though the possibility is small—into single events.

"Reason is based on the memory of the animal. We don't know how primitive beast-men would react to a given stimulus, because we've never had a real beast-man to work with. Now, experimenting on the reactions of this subject, if he lives, we can perhaps solve the mystery of thought. The individual memory, contained in these two lobes, can never be solved, I think."

"How're you going to stimulate the pineal gland?"

"Well, I can't inject it into the pineal gland itself, because it's down at the very base of the brain, and to reach it I'd have to cut through the entire brain. Besides, it's only about fourteen millimeters in length, and quite hard to find. So I stimulate it in the same way any gland is stimulated—by glandular extract injected intravenously."

He inserted the point of the hypodermic into a vein in the left arm, and pressed the plunger. Withdrawing the hypodermic, Dr. Cobb placed it on the tray at his elbow and prepared to close the skull. First he removed the thin layer of bone wax; then set the top of the skull into place, after throwing the three membranes back into position. Stitching the scalp was a routine task that took him only a short time. He then bandaged the head tightly.

Rollins removed the ether cone. Tired after the ordeal with its discouraging complications, Cobb pulled off his powerful glasses and switched off the operating lights. As they turned to go to the wash room, Rollins glanced back. The weird, white scene, centering on the still patient, became normal once more. He looked again at the victim's face, a twinge of guilt torturing him. It was white; the features had relaxed into a vacuous, brutal expression, like nothing he had ever seen on an anæsthetized person. He shuddered and followed Dr. Cobb.

The tiny operating laboratory down in the cellar of the old yellow brick

house near Central Park, was quiet. But the subject, even without his frontal lobes, breathed normally——

FOR DAYS after that, Cobb was unable to leave his bed. He was completely exhausted. Rollins had to remain in the house, taking care of the old surgeon and his patient. A friend, meanwhile, took care of his tiny practice in his absence. It was a small job.

Even after Cobb was able to walk around, he insisted that Rollins stay with him. The first day he was strong enough to examine his patient—a week after the operation—he was astounded.

"Why, his recuperative powers are remarkable!" he exclaimed to Rollins. "What are you feeding him?"

"Raw meat," Rollins said quietly, smiling calmly.

Cobb stared unbelievingly. "Raw meat! You're jesting. He shouldn't be able to hold more than soft vegetables."

"Tell him that. Maybe he'll believe you. I gave him cereals, milk, broth, vegetables—everything—and he almost starved to death, until I found he would eat nothing but raw meat. I had to give it to him. Fresh, of course, and quite raw and bloody."

Cobb shrugged helplessly. "His organs are functioning properly, though?"

"All of them," Rollins said animatedly. "He isn't strong enough to stand of course, but he can wiggle his toes when I tickle them. Genuflection superperfect, and every other reflex the same. Only, he can't talk."

Dr. Cobb stared at him. "You didn't really expect him to, did you? That was merely an unnecessary proof," Cobb said a trifle smugly, "that the frontal lobes do control memory. Have you a sharp knife?"

Rollins handed him a pointed knife. The old doctor hefted it a moment and stabbed it swiftly toward the patient's heart. Rollins cried out—grabbed at Cobb's arm to stop him. But just before it reached the skin, it slowed suddenly. Dr. Cobb's nerves were marvelous. He pricked the skin a little, purposely.

The subject, watching vacantly the preliminaries of the test, made no move until the sharp point touched him. He jerked away from it, his hands clenched weakly. A pistol pointed at his head signified no danger to him. He turned his head and looked directly into the barrel. Similarly, he grasped lighted matches and yelped with pain when they burned him. Books and pictures, held before his eyes, had no meaning for him. His memory was gone completely. There was no doubt of that.

In the two months that followed, Rollins had to devote only three hours to his practice; three hours coinciding with the afternoon naps of the old doctor and his patient. The rest of the day he had to spend feeding and sunning the two of them on the flat roof. It was midsummer and warm.

The subject seemed perfectly content to spend the daylight hours on the roof, sleeping in the sun and eating his raw meat at three-hour intervals.

His appearance was growing more and more startling every day. Hair was covering his entire face and body. It was impossible to shave him, for he moved uneasily under the razor and threatened to cut himself. They tried a cream depilatory, which he liked because it was cool. He got great pleasure out of pulling away, with the greatest ease, handfuls of the hair that covered every part of his face. He learned to use it himself, and carried it around in the pocket of a suit they had made for him, smearing it on at various odd intervals. It kept him looking human, at least.

The suit, underwear, socks and shoes they bought for him he wore without noticing. He tore ties from around his

neck, however, nearly strangling himself, until they took no more chances and put none on him. Nevertheless, he was unable to dress himself. This process, as well as almost everything else, was Rollins' daily duty. Curiously, the restriction of clothing came naturally to him. He offered no resistance when being dressed.

His physical progress was remarkable. By the end of three months he was completely well; the bone healed perfectly, and other than a prominently raised cicatrix, the scalp wound was entirely mended. His habit of smearing the depilatory all over his face and head left the scar naked and ugly.

Wilhelmina, the old housekeeper who had been with Dr. Cobb's family for years, was frightened by his vacuous stare and his hairy paws. He had to be kept out of her sight.

At night he slept on the floor of his room, which was on the first story, for fear he would walk out of the bedroom windows on the second floor. Though he spent most of his time in eating and sleeping, the muscles of his body became extremely hard and powerful.

In nearly all matters, as the time of eating and sleeping and obedience to simple orders, he was singularly docile. So unresisting was he that they often left him alone for hours at a time. This was safe enough, for, unlike a child, he displayed no curiosity, but like an animal, took his surroundings as a matter of course.

They did this once too often, however.

THE MORNING had dawned darkly, with the sun hidden by many heavy clouds drifting in from the east. Rollins hoped it would clear, because his subject became fretful and restless when kept in the house during the day.

Rollins had been called away directly after lunch. Before leaving, he made certain that the beast-man was in his room, as peaceful as he could be indoors. The subject was moving up and down restlessly, and to take no chances, Rollins locked the doors and window.

The patient roved about the room after Rollins left. He was hungry and he wanted the sun. They had offered him a piece of meat, part of which he ate through sheer hunger; the rest he hurled aside. It was perfectly fresh, but dry.

Upstairs Dr. Cobb napped after a good lunch.

To the patient, the door appeared no different from the rest of the wall. The color was not the same; that was all. If he thought at all about entering and leaving a room, the doors apparently were not connected in his mind with those processes.

The window, however, facing the street, seemed to his brute mind a natural exit, since through it he could see the light. He walked toward it and attempted to climb through. The glass resisted. In a certain degree of wonder, the same as a cat or dog will demonstrate on walking into a pane of glass, he poked his hand at it. He pushed the pane out of the frame effortlessly, but escaped cutting his hand. Squeezing through was a bit difficult for his bulky, muscled body, but he managed to force his great shoulders out and followed them in a heap, landing in a tangle with a bush five feet below the window.

As he looked about, trying to determine which way to go, he saw the green of the park and smelled the breath of trees. It attracted him. He shuffled clumsily toward it. Hunger still annoyed him. The traffic was heavy. He was baffled and frightened by the roaring, honking noises the rushing cars made. Shuddering fearfully, he stood huddled against the wall of a house until the torrent of cars stopped suddenly. He darted madly across the street.

On the safe side he wandered along a great stretch of iron fence that puzzled

him, for he could push his arm through and yet not his body. Eventually he found a path leading into the park; he followed this until he came out beyond the trees, to an open grassy place, where he stepped over the low railing and stamped gratefully on the soft ground.

Hunger bothered him. His quick eyes caught the image of a squirrel, almost hidden in the grass, sitting erect on its haunches, stripping the shell off a nut. He crouched, moving swiftly and silently toward it.

Unafraid, the tiny animal glanced up at him, and went on, its small paws clasping the nut and its sharp teeth flashing, cutting the tough shell.

When he was five feet away from the squirrel, he crouched slowly, not to alarm the animal, and sprang, hurling his whole body at it. The squirrel was quicker than he was. It darted out from under the arc of his spring, dropping its nut and scampering swiftly up a tree.

Recovering his balance immediately, he tore after it, clambering up the tree trunk clumsily, hampered by his shoes. He ripped at the leather with his strong fingers, tearing it away with great effort; then pulled his socks off. Now he was able to climb more rapidly.

The squirrel scampered ahead of him, darting out on a thin limb at the top of the tree, and shrilling complaints at him. He jumped at it, his trouser cuff catching in a sharp bough. He fell heavily to the ground, bringing down the thin limb and the squirrel with him.

Ripping the trousers off, he limped after the animal, which was badly hurt and made a weak attempt to get away from him. He caught it without much trouble. His powerful hands and teeth made short work of the tiny squirrel.

He ate quickly, hungrily, tossing the clean-stripped bones away.

It was cold and moist. He got up, limping, tried to find a warm, dry spot to sleep. He had eaten, and the fresh, clean meat rested comfortably on his stomach.

At seven o'clock it began raining heavily—a chilly downpour. When lightning flashed and thunder roared, he grew afraid, cowering under the trees when the lightning burst across the sky; dashing madly on when it had ceased, toward the lights across the park. For four and a half hours he ran on and on, after he had struck a road, which he followed. It led him around the park, in large half circles. Sometimes he neared the street; more often he darted farther away.

THE NEWS that their subject had escaped affected Dr. Cobb like a terrible blow over the heart. Rollins came back at half past four, from his office, and looked in to see if the beast-man was warm enough, for it was getting colder toward sundown. The window was pushed out of the frame, and the cold wind and heavy rain beat into the dank, miserable room. The beast-man was gone—he had been gone nearly three hours by that time——

Rollins rushed up the stairs to Cobb, who was still sleeping.

"He's gone!" Rollins cried, shaking the old doctor wildly.

"Who? What? He's gone?"

"Broke the window and climbed out and——"

Cobb caught hold of Rollins' lapel and shook him. "You don't think there's any danger, do you?" he wheezed fearfully.

"I doubt it. Who knows? He was docile enough here. But out in all that noise and traffic he may go wild——"

"Good Lord! I hope not!" Cobb cried out. "Where is he eating? What's happening to him? And it's raining. A cold'll be deadly to him, you know. If he catches a cold—it will kill him!"

Rollins stared out the window. Cobb paced back and forth. It unnerved him. He could not think. He did not want

to think—a primitive beast-man loose in the streets of New York. A beast-man with the instincts, minus the memory, of an animal, and the strength of—a savage?—an ape?—— Cornered, starved, frightened——

His mind painted a fearsome picture of mangled bodies, screams and wild shots.

"I'm going to call the police," Rollins declared. "It may become dangerous after all."

Cobb clutched his sleeve, forcing him to stand still. "You can't!"

"Why not?" Rollins demanded coldly.

Cobb sank down heavily on the bed, clasping his head with his trembling hands. "Don't you understand?" he wailed. "We experimented on a live man! It's illegal. If we're caught, it means a life sentence; and if he dies, we'll get the death sentence!"

"What do you mean—we?" Rollins snapped harshly.

"You assisted at the operation. You took charge of the anæsthesia."

Rollins seized the old doctor by the collar and hauled him up fiercely. "Why, you old—you——" he struggled with emotion, threw the old man back on the bed.

"You won't gain anything by killing me," Cobb pointed out. "It's too late for that now. The only thing we can do is stick together and find him, before he dies or is found by the police or attacks some one."

"Well, what're we going to do?"

Cobb stumbled over to the window and stared out, leaning weakly on the sill. The chill rain swept in on him. He shuddered and drew back, shutting the window. "Nothing now. We can't. Not until the rain lets up, anyhow. We'd never find him in this weather—— He's probably shivering in some out-of-the-way hole in a house or subway—or Heaven knows what!"

A blinding flash of lightning burst across the sky, lighting up the dark city. Thunder roared deafeningly directly overhead. The house shook terrifyingly——

IT WAS close to midnight when the rain stopped. In the terrible darkness he had lost the road, and now he stood trembling with cold, the chilling water dripping from the trees above soaking him even more completely. The blackness lessened. Through the steaming trees he saw a black mass of shadow huddling, a great blotch of gloom, near a small lake. He slushed through the thick mud and grass toward it.

Inside it was damp and chilly, but there was a tiny office where it was a little warmer and drier than outside. He tore his wet clothing from him and stretched out on the cold table. There was a huge canvas tarpaulin, that had been used to cover the rowboats, but it never occurred to him to cover himself with it. He shivered and drew himself together in a huddle, until the cold wood of the table was warmed by his body. He fell asleep.

The boathouse on the little lake never saw a stranger sight than the tall, powerful beast-man, covered with short, thick, straight hair all over his brute body, and breathing heavily, shivering now and again with the penetrating cold, and drawing himself into a tight ball to protect himself from the damp cold.

There was little sleep in Dr. Cobb's house that night. First they waited for the rain to stop, and when it did they determined to wait for the sun to come up.

Dr. Cobb sat, his head in his hands. Dr. Rollins stared out of the window or paced furiously up and down. The hours passed slowly—more slowly than Rollins thought they could ever move. Splendidly, after long hours of deepest darkness, the sun rose. The day promised magnificence.

Rollins turned swiftly on the old

doctor. "Now what do we do?" he asked with drawling sarcasm.

Dr. Cobb did not answer. He was asleep. The deadening vigil of the long night had exhausted him. Rollins stared thoughtfully at him.

They were both in the same boat, he knew. If one got caught, the other would also. And when the police had proved their crime, it would mean life. If their beast-man should kill some one——

They had to stick together. There was no sense in antagonizing old Cobb. To save himself he had to save the old doctor too. They would have to work together.

He shook Dr. Cobb gently by the shoulder until he awoke. "The sun's up," he said, softly. "Now what do we do?"

Cobb stretched himself slowly. "What do you mean—what do we do?" he yawned. He started. "I forgot all about—him!"

Rollins shrugged. "I didn't. I've been thinking all night. We've got a damned big piece of territory to search. We'd better call the police and take our chances."

"Are you crazy?" Dr. Cobb cried. "We'd never get away with this—it's too serious! We can't call the police. Not until we find we can't get him ourselves, at least."

"Well," Rollins said quietly, sitting down and lighting the last cigarette of the two packs he had smoked during the night, "we'll probably hear from the papers soon."

"What do you mean?" Cobb asked hoarsely.

"We'll hear from them soon. That is, unless your beast-man behaves himself and keeps on acting like a domestic animal—which he won't—you can depend on that."

Cobb clutched tremblingly at his own throat. "Why?" he wheezed.

"Because he's a beast-man. That's why. And the longer we leave him on his own the more dangerous he'll become. Just let him get hungry and start searching for his raw meat! You'll find out in the papers just what happens——"

AT NINE o'clock that morning the keeper of the boathouse walked down the path, searching in his pocket for the key. A number of people were waiting for him.

It was unnecessary to use the key. The door was open.

"Hey! What's this?" he shouted, sticking his head cautiously in at the door.

The beast-man woke with a start and jumped off the table.

"Get back!" the keeper screamed in fright. "An ape! Get back!"

Every one leaped out of the way and started running. Startled, the beast-man rushed out of the boathouse to the security of the trees. He gathered himself together, and leaping to a bough swung himself from tree to tree, out of sight.

The boathouse keeper scampered into the office and banged the telephone hook up and down until he got an answer.

"Give me the police!" he yelled. "Police! Police! There's an ape loose in the park. A gorilla—an enormous gorilla! He started to attack us but we scared him off——"

Two radio cars arrived within three minutes.

"What's happened here?" the driver of the first car shouted.

"A gorilla's loose in the park!" the boathouse keeper yelled.

"Where'd he get loose from?" the cop sneered.

Trembling, the keeper shrugged his shoulders. "How d' I know? And I don't care. All I know is there's an ape in the park."

The four cops looked around vaguely.

"Ask them people." The keeper waved his hand toward the path outside the boathouse. "They seen him same's I did. They'll tell you."

But there was nobody outside the house. In various stages of nervous collapse, they had all disappeared. The cops shrugged their shoulders helplessly and promised to look into the matter. There was little conviction in their voices, however.

DR. ROLLINS stopped pacing the floor suddenly and stood squarely before Cobb.

"If you don't want to call the police, at least we ought to get a private detective agency working on the case. We're not fitted to go searching the whole city——"

Cobb looked almost convinced. His haggard, old face was lined with suffering and worry. He wanted to get the burden off his shoulders. Even if the police had to shoot his beast-man it did not matter to him, so long as he got rid of his fear and worry.

The telephone bell jangled. Wilhelmina shuffled in.

"It's for you, Dr. Rollins," she said in her high, cracked voice. "It's from your office."

"Tell them I'm not here," he snapped. "Tell them anything."

"Dr. Little says he has to talk to you," she insisted.

Rollins made a little gesture of impatient resignation and strode angrily to the telephone.

"Hello!" he barked.

"Bartholomew's here," Dr. Little said "He wants to see you. Jump right over."

Rollins clapped the receiver down. "I've got to go," he called to Cobb. "I'll be back in ten minutes."

Cobb shuffled in. He wanted to beg Rollins not to leave him, but lacked the courage. Instead he said: "I wanted to go over to the agency."

"Wait till I get back," Rollins called back to him as he closed the door and hurried over to his office, only three blocks away. Old Bartholomew was his best patient, and to refuse to see him would be endangering one of his principal sources of income.

"Ah, Mr. Bartholomew," he greeted his patient cheerily. "You're looking well this morning."

Mr. Bartholomew looked anything but well, and hastened to insist on the fact that he looked as bad as he felt. White and painfully drawn, his face was lined with fear, and his hands shook violently. He looked sick enough to need a doctor.

Rollins took him into his office and seated him. A glass of whisky calmed him slightly—enough to tell his story.

"You know you told me to exercise, doctor," Bartholomew said shakily. "So I've been rowing an hour every morning for the last two weeks. And it's been doing me a world of good," he hurried to affirm. "Only this morning I went down to the lake as usual, to take out a boat. And this time I was ahead of the boathouse keeper, so I waited around. He came down the path looking for his keys, but he didn't need his keys because the door of the office was torn right off its hinges. He looked at it, sort of baffled, and stuck his head in to see if there were any robbers hanging around yet. There weren't any. But there was a giant ape inside and it came dashing out after us——"

"A—*what!*" Rollins yelled.

Bartholomew started back. "I didn't drink last night. I swear it! And there were about ten other people around the boathouse, waiting to take out boats. They all saw it, too!"

Rollins gulped. "Here—here, you take these pills," handing his patient a

tiny box. "Stay in bed all day. You've had a pretty bad shock."

"I'll say I did!" Bartholomew agreed lustily.

"Drop in to-morrow," Rollins added as an afterthought, when his patient was leaving. Bartholomew felt better already, but Rollins felt more and more depressed.

He took a cab to Dr. Cobb's house.

"He's in the park!" he cried before he could close the door.

"How d' you know?" Cobb demanded.

"A patient of mine told me. He saw him in the park. He said he was a giant ape. So he must have torn his clothes off and he's covered with thick hair."

"Well, what'll we do?" Cobb wailed.

"I don't know. All I know is we've got to get him out of the park before he goes crazy with hunger and attacks some one."

"How're we going to do it?"

"Get your detective agency working. Cover the park with men holding chunks of raw meat. He'll smell it and come near to be fed."

"I'll call one up right away."

"Get the biggest agency you can. We'll need plenty of men."

CHESTER, head of the City Private Detective Agency was at the house in ten minutes. He sat, listening to their story, bewildered.

"Sort of a missing link, is that it?" he asked.

Cobb and Rollins nodded quickly.

"And he's in the park and he's tame? And you want me to get him out for you?"

"Right," Rollins said. "I want you to cover the park with as many men as you can get together—but they've got to be strong, fearless men, who won't be afraid of a tame ape. We'll supply the raw meat."

"Well," Chester shook his head doubtfully, "this sounds kind of crazy to me. It's the first time our agency ever rounded up a tame ape, but I guess we can do it, if you say so."

"Good," Rollins cried enthusiastically. "Get as many men as you can in the park as soon as possible. We'll be there with a van full of raw meat!"

Chester left, shaking his head slowly from side to side.

An hour later there were fifty men, apparently from the strong-arm department, waiting for the meat van. They were powerful huskies, able to walk into any dive in the city unarmed and leave with fewer scratches than any one they had encountered. Rollins and Cobb were satisfied with the group.

"Walk through the park, among the trees," Rollins instructed them, "waving your chunks of meat above your heads. He may come tearing out at you, but stand your ground. Don't drop your meat and run. Just stand still and hold the meat out for him. Then leave your partner with him and call for the others. Don't try to fight him!"

Strollers in the park were amazed to see tall, muscular bruisers waving enormous sides of raw meat above their heads, and walking swiftly through the groups of trees.

"I feel like a nut," "Spike" Garn complained to his partner, "Smitty," as the two bruisers walked along, waving their slabs of meat over their heads. "Who ever heard of putting the grab on a ape? Huh!——"

"Quit yer grumbling. Hey!——" Smitty shouted. "Look at that!"

"Hully chee!" Spike mumbled. "It's the ape——"

"Stand still and hold your meat out."

The beast-man, his dense shaggy coat filthy and covered with briars, dropped out of a tree twenty paces away, and ambled toward them. Drooling, he bore down on them, his immense paws outstretched.

"I can't stand still!" Spike quavered.

"You've gotta! He'll tear you apart if you move——"

They stood trembling, holding out their huge sides of meat. The beast-man tore it out of their hands and squatted, ripping at the meat with his powerful teeth. They stared at him, fascinated.

It was then that they made their mistake. Instead of waiting for him to finish eating, they attempted to seize him and drag him to the two doctors. He snapped their strong hands away easily and growled as he bent over his meat again.

They had not learned their lesson yet. Insistently, they gripped his great arms and tried to pull him to his feet and drag him away. He grunted angrily, flailing his enormous hands and tearing at them furiously.

"Help! Help!" they screamed hoarsely.

Twelve men came running. Spike was unconscious. Smitty was bleeding from dozens of deep gashes in his face and all over his body.

The ape-man was peacefully squatting once more, eating greedily.

"Grab him!" some one shouted.

"Get back," some one else yelled. "I'm going to plug him!"

Rollins and Cobb came running.

"Stop!" Rollins screamed. "Don't shoot him——"

Panting, the two broke into the ring of infuriated men.

"He killed Spike!" they roared. "We're going to plug him."

"No! No!" Cobb croaked frantically. He jumped in front of his beast-man to protect him. The brute looked up quickly, his black iris including the entire pupil of his eye, and started back slightly, ready to fight for his food again. Some one aimed a gun at the beast-man. Cobb stumbled back to cover him.

An enormous hair-covered arm shot out quickly and grabbed the weak old doctor. He was flung at the ring of men. There was a snap, and he hit two men furiously. They fell heavily. Cobb lay still. His back was broken.

"He's a killer!" Smitty roared. "Get him!"

The ring of muscular bruisers fell on the beast-man. He was caught squatting, almost unable to get up. He clutched his chunk of meat in one hand and fought his way to a standing position.

Gun butts smashed down on his thick skull. The men were packed in tightly, almost unable to fight.

He lifted one above his head and swung him around like a club.

They were thrown back. He stood, swinging the dead man above his head, grunting and growling terribly.

Guns barked deafeningly. One simultaneous roar.

The beast-man dropped, screaming. The yelps of pain were horrible. He thrashed around, tearing up the ground with his huge paws. A moment later he lay still, gouts of blood still shooting out from bullet holes in his great shaggy chest.

"It was a great fight!" some one panted.

"Yeah," another agreed. "But where's the boss?"

Rollins lay under the heap of mangled, fearfully gashed men. He had been the second to be killed.

Cobb had been the first——

"Well," Smitty grunted, staring down at the great hairy corpse lying beside the heap of his victims, "messing up a missing link's all right. Only next time we do, we keep the bosses who are supposed to pay up, out of the fight——"

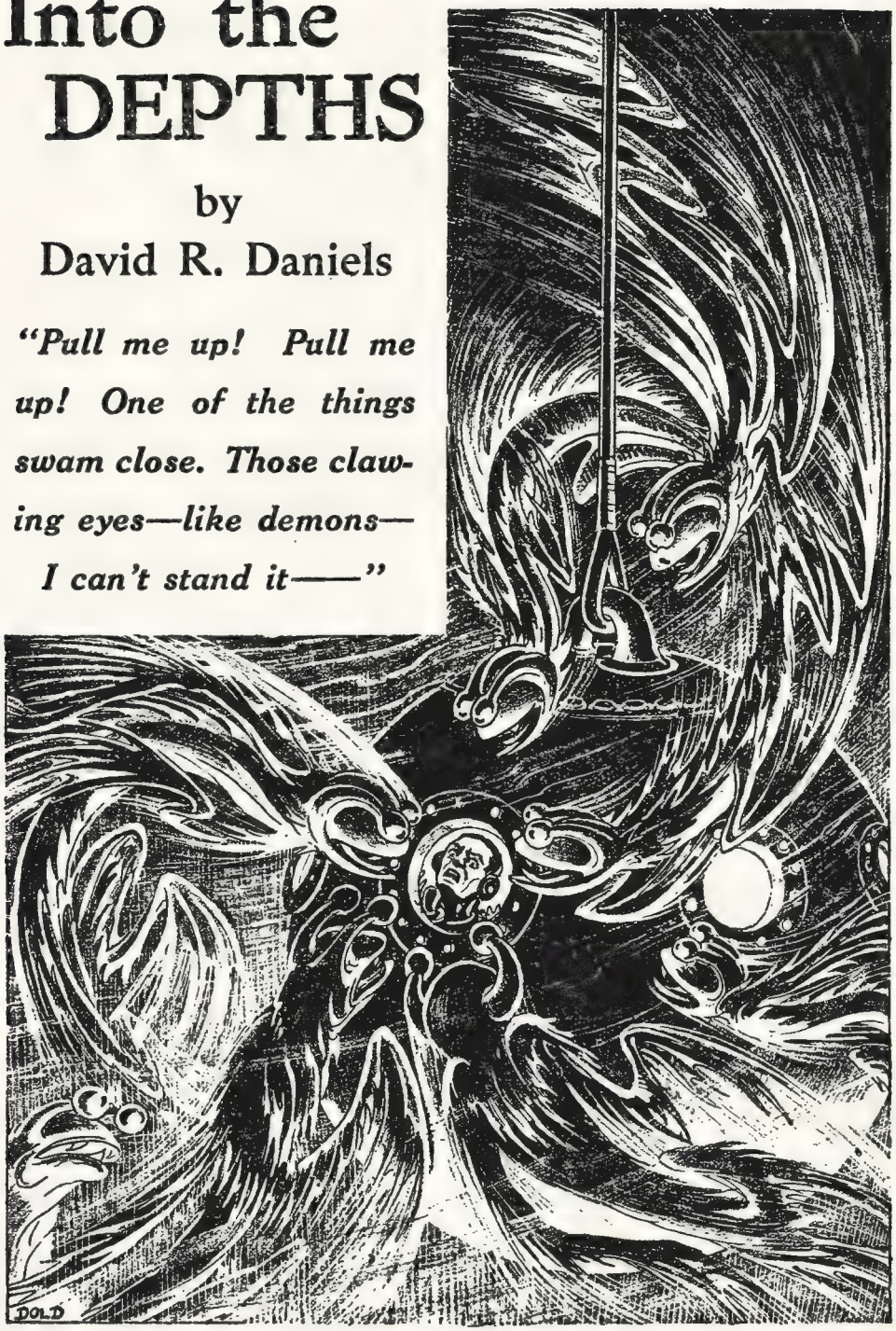
The police came running up, but there was nothing for them to do. The men who had been responsible for the horrible experiment were beyond their jurisdiction.

Into the DEPTHS

by

David R. Daniels

"Pull me up! Pull me up! One of the things swam close. Those clawing eyes—like demons—I can't stand it——"



"ALL ABOARD?" Craig called jokingly into the phone.

"You bet; let's go," Lovelace answered.

The cable tightened and the submaresphere swung slowly out over the water, its burden dangling a dozen feet below. Then the huge drum, carrying its miles of steel cable, unrolled smoothly and in a moment the sphere had vanished beneath the surface.

The sea was serenely calm. One could have guessed, gazing down into the depths, that it was a hundred miles deep instead of only four and a half. The white sun shone out of a tropical sky, and the few waves lapped lazily. Craig wiped the perspiration from his forehead.

"Tell Davy Jones 'hello' for me when you see him," he said into the phone. Lovelace was off on a trip of nine miles —half of them straight down, the others back up again.

It was in the Banda Sea between Java and New Guinea. Beneath the ship's keel was a great gorge where the warm water dropped away to icy coldness at more than 23,000 feet. The chasm must have been a deep bay when the Lost Continent—of which Borneo and Java and their sister islands are but the tips of mountains—was still dry land.

The voyage had been to ascertain whether or not there had been a civilization which vanished with the Lost Continent. Several times the submaresphere had been hauled overside and dropped away, though to comparatively shallow depths. Lovelace, Craig, and Donaldson had all three taken pictures of the ocean floor, and each time they had found exceedingly interesting things. In the hold were stored films showing dimly barnacled ruins among which strange fish swam. They were what was left of the drowned cities of a more or less civilized people.

But that had not been the only objective of the cruise. They were also out to establish a new record for descent into the depths. Lovelace was especially interested in breaking that which Scott of the Underocean Society had made the previous year, in 1948, when he went down into the Indian Ocean to a depth of three miles.

So, after they had satisfied themselves in the matter of ruins, they steamed proudly over to the Banda Sea to try at the record.

The submaresphere was of the latest type. Not only was it built to withstand the inconceivable pressure of nearly 15,000 pounds to each square inch of its surface, which it would encounter were it lowered to the greatest depth any ocean offered, but also it had built-in tanks of light gas to make it nearly weightless in the watery element. Otherwise it would have been impossible for it to go to any great distance, since no cable on earth could have held it, let alone have drawn it back up again.

Craig and Donaldson took notes as the drum let its weight down into the sea. At present what they heard was only the usual thing—fish encountered, the fading of colors from the spectrum, etc. It was given as much to assure the men at each end of the line that matters were progressing as they should.

"Now that the water has closed in around us," Lovelace said in the plural sense, though he was the only occupant of the sphere, "all red and orange rays are shut at once from the sunlight."

"One hundred feet," came the clear voice of a sailor from across the deck.

"There are now left only the blue and the green."

"Damn it!" came Donaldson's voice. "All that's old. Tell us a fairy tale."

Lovelace sounded almost gloating through the phones. "Still sore, Donaldson, because you aren't along? We talked that over a dozen times. Two of us on a trip this far would use too much oxygen, you know. You'll have plenty of time later, north of the Caro-

line Islands, maybe, where the water is six miles deep."

"Seven hundred feet."

"Water is blue now. Dark, but almost luminous." Lovelace's voice came like an echo.

But, as Donaldson said, they all knew this. There wouldn't be much light now, down where the submaresphere was. But there would still be enough to make the great searchlight seem dim. The water let through a little light for a long way—all hues of blue darkening grayly into final black.

SO the drum rolled away while the submaresphere sank down from the sun —1,000—1,200—1,500. At 1,800 or 1,900 all light would be gone and the search beam would be the only outside light to show in a world that had been completely dark for millions of years.

Lovelace's voice came steadily over the phones. He told of the fish he saw; now they carried their own lights. Big fish, little fish, middle-sized ones, shining opalescently or with cold fire. Living always away from the sun, but fighting, and eating, and dying just the same.

Craig could imagine Lovelace close against the eighteen-inch-thick quartz windows, staring steadily out as this new universe unfolded. It was lonesome and dark, and so cold that the heat of the searchlight could not warm it; but Craig wished he were there.

Always the drum was unwinding. So far nothing had been seen really worthy of note. The sailor had just called 6,500 feet when Lovelace said excitedly, "Some great creature just swam through the beam. Thick and bulky; fifty feet long, I should judge. Unlighted."

"Probably a whale," said the phlegmatic Donaldson. "A chemical change naturally takes place in the blood of such animals. It allows them to descend to more than a mile and to come up without getting the bends."

"Probably," Lovelace agreed. "However, I believe this to be the deepest one has ever been sighted."

"You're right," Donaldson said more pleasantly.

"Things are blacker than the blackest of jet," Lovelace was saying as the sphere passed the two-mile mark. "There is no comparison to it anywhere on the surface. The fish are small and dart by so that I can only catch glimpses of them. It would be easy to imagine that I was out in space. The small points of light I see are so reminiscent of stars.

"The quartz is extremely cold. Nearly down to freezing point, I should say. The searchlight pours out bravely but is swallowed up in a little distance. Its rays do not diffuse. Its round beam is clearly discernible, since on all sides of it everything is so unutterably dark."

Somewhat later he asked, "How deep am I?"

"Fourteen thousand feet," Craig answered.

"I'm getting close to the record then. Let's see; the pressure around me, considering thirty-four feet to one atmosphere, fifteen pounds—more than 6,000 pounds to the square inch, that would make it. Yet, by looking into the water one would never know it. I can't realize that if I were thrust outside I would be crushed to murky mud."

"See any new fish?" It was Donaldson asking.

"None that I can discern readily—— While I was speaking a three-foot thing, nearly all jaw and tail, swam through the beam. Its teeth were enormous; as it passed out of the ray I saw that it carried two lights on stalks protruding from each side of its tall, slim head.

"The fish pay no attention to the searchlight. They neither flee from it

nor are they attracted to it. Perhaps they mistake it for luminous mist like that which certain deep-water creatures throw out to confuse their attackers."

The cable was out to 16,000 feet before long. Craig said, "Lovelace, you've broken the record: you're 160 feet past it now."

And Donaldson came in with: "Congratulations."

"Thanks," Lovelace replied. "But really, being down here and seeing it all is worth much more than the thought that a record has been broken. One feels so removed from every surface thing, looking out at this."

A hundred feet deeper he was saying: "There are few fish now. It is seldom that they swim into the ray, and I see almost none of their lights. I wonder if the scientists who think there is no life at extreme depths are right. It is strange to think that beyond four miles the water is untenanted."

As he was passing 20,000 feet he said: "It must be so, however. There is no spark here except the searchlight. I could believe that I was dropping forever through some void, toward another universe. It is as though the water were crushing me in, though, of course, the sphere is as sound as ever."

"Look at your air," Craig suggested. Covering up his phone, he said to Donaldson, "I don't like the sound of that."

"The air's all right," came Lovelace's voice. "What's the matter? Did what I said sound cuckoo?"

Craig replied honestly, "You did sound kind of funny."

"Perhaps so; but that's the way it is. When I look down I can see a faint luminescence. As yet it's hard to say what it is. Could the rock of the bottom here give off light?"

"Possibly," the scientist, Donaldson, put in; "wholly improbable. Anyway, you wouldn't be able to see it. You're only down to about 20,650, while the bottom is around 23,500. No light could show through 3,000 feet of water."

"You're right."

THEN, later: "Where am I?" It was an awed voice.

"Say," asked Craig, "are you going goofy? Did something hit you on the head?"

"No; of course not. It's that luminescence. A while ago when I spoke, the water seemed shot through with faint light, now that light has resolved itself into hundreds of small orbs. They have the appearance of stars through a great telescope.

"As I come closer I see spheres. What their size is, I can't say. Some of them seem close; now the searchlight is striking one. But it doesn't show what it is. By the beam, the thing seems only a gray ball. Now the light has passed it; it is brilliant again. I tell you, it's like a sun. It's practically stationary.

"Yes; and now I see other, smaller orbs swinging slowly in circles around it. What can it mean?"

"It must mean you're nuts. There couldn't be such things down there." This from Donaldson. "Perhaps all that pressure has caused some sort of mental mix-up in you. I can't see how it would, but something of the sort must be the matter. Shall we give orders to have you pulled back up?"

"No." Lovelace's voice came in strong. "Honestly, fellows, it's the truth. There is a planetary system on a small scale down here. Even if it is impossible. Stars—planets—galaxies. They shine blue-white, or nearly burned-out red. They can't be hot, but they certainly give that appearance. Possibly they're radioactive to some extent. The planet things circling them are

lighted only by reflected light. That's why I didn't see them at first."

"They're animals?"

"No; they're not alive. At least I'm quite sure they're not. Men, can it be that there are infinitely tiny creatures inhabiting those things? Things to which the sea seems like empty space? Perhaps—oh, Lord; I wish one of you were here."

Donaldson covered his phone with one hand and signaled Craig to do likewise.

"Say, what's the matter with him? When he first started I thought he was spoofing; that's why I made that crack about pressure. But something must be wrong. Suns! Great Jupiter! Suns at the bottom of the sea!"

"Darned if I can say." Craig shook his head. "But he must be seeing something mighty queer. 'There are more things——' Well, you know how old Bill put it."

"But he sounds nutty."

"I hardly think so. His voice is normal. He only sounds like he was amazed out of his senses. He certainly thinks he sees it all, or he would have blown up after what you said. And if you ask me, he might cook up a tale like that, but he's not actor enough to put it across. Still, he's too hard-headed to go nutty that easily. Let's listen."

"Yeah. I'm getting that fairy tale, all right."

"Yes, those things are stars. They revolve in spaces far closer according to their general scheme, but the resemblance is nearly perfect, nevertheless. As I look through the black water, like black interplanetary space, I see the globes stretching away. In the distance they shine solid, like the Milky Way.

"Close to me is a large double system composed of two suns, one red, one blue. Around them are five planets at distances ranging from eight or ten times the diameter of the central spheres to twenty or thirty times that far. And one of the planets is ringed!"

"Did you ever hear anything like it?" Donaldson's hand again covered the mouthpiece. "Well, nutty or not, it's best to leave him down there a while longer. We'll let him go on down to the bottom. He can't do any harm."

"No; he could only shut off his oxygen. And he's not the sort to do that. If he did, he'd be smothered long before he reached the surface even though we started pulling him up now. He's only got about fifteen hundred feet more to go."

"The layer of suns is thinning. Below me they no longer seem solid. Believe it, what I'm telling you is the truth. You can see for yourselves when I come up."

"Fine," Craig said. "Sure you're O. K.?"

"Yes, of course. I know this sounds like raving. It's not, though. Who'd ever have thought of it? Suns on the bottom of the ocean! When I look out at them it makes me almost afraid to go on. As though I were getting clear out of our scheme of things. It scares me to think what might be farther below."

"There's a lot of black mud, probably—in which you want to be sure you don't let us stick the submaresphere."

"You don't believe me, do you, Donaldson? Well, before long you'll have your chance. How much farther have I to go?"

"A little more than a thousand feet is all."

THE DRUM was still unrolling, though now the cable passing across the deck showed that it had only a few hundred feet to go.

Lovelace said: "There are but few of the star things around me now—I almost said in the sky. Those which are

on a level with the sphere are monstrous, proportionately.

"Now I can see a slight luminescence below. Like reflected light. Light reflected by stars from a world——"

"It's the bottom this time," said Donaldson.

"Yes, I can tell that much. I am straining my eyes downward to make it out. It seems that there are towers rising from the ocean floor."

"What are you going to see now? People?"

"No, though it would hardly surprise me." Lovelace was too wrapped in his watching to note the heavy sarcasm. "But that there's life here, I'm sure.

"Yes, the towers are artificial. They rise sheer and high like stalagmites; their reflection is similar. I can barely perceive queer things swimming among them——"

His voice trailed off. Craig, on the deck so far above him, could imagine him watching fixedly through the quartz window in the floor. A little shiver ran through him. He didn't know why, but it seemed to warn against something sinister.

Donaldson was interested in spite of himself. He sat tensely, gripping the arms of his chair.

"Yes, there *are* things swimming. They seem half manlike, but—inhuman."

Donaldson muttered, "I told you."

"Lord! Pull me up! Pull me up!" It was a wail. "One of the things swam close. Those clawing eyes—it's horrible! I can't explain it. They're like demons! I've covered my eyes. If I look again I feel I shall go mad. Pull me up!"

He stopped. Craig gave the command to have the drum stopped.

Lovelace spoke again, more calmly now. "I can hear the things fumbling outside. They're all over the sphere. It sounds like they were attaching something to it. I shall glance once."

He sounded unutterably horror-stricken.

"Yes, they are. I was forced to grip myself to hold my mind. Don't pull up now. If you do, those things will come, too. I can feel that they have been waiting ages for this chance. It would be better if you cut the cable. I'll be all right. The air will soon be gone; anyway, I can shut off the oxygen."

Donaldson was making a spiral motion around his right ear with one forefinger. Craig nodded, even though the horror in the man's voice had come close to unnerving him. Even Donaldson seemed affected, though he tried to appear otherwise.

And then the cable went taut. Craig was giving the order to have the submaresphere brought back up when the thing hummed like piano wire. It stretched to the breaking point.

Both men were sure that it could not possibly hold a second. They leaped to their feet with the instinctive idea of holding it together by main strength.

It was a moment which neither ever remembered clearly. Lovelace was raving now; the engine was choking at the task of pulling up a tremendous weight. Then something came lose, and the cable was rolling in, too easily, it seemed.

The next few hours were like a memory of delirium, as both men rushed from winch to deckside and back again. Lovelace talked the whole time, but strangely, very strangely. And when finally the submaresphere was pulled above the surface, it showed that something had been attached to it, though whatever it was had broken free.

From Lovelace they never received any more enlightenment, for the picture recordings had stopped at 20,000 feet; and for weeks Lovelace was incoherent. Even when he recovered he could not remember.

9 Complete Stories!

I'm proud of this line-up. I didn't know until too late for a cover announcement but I want you to notice.

Nine complete stories and a John Taine serial in one issue! And a list of names, led by Harry Bates, including Schachner, Stuart, Wandrei, Vincent and Gallun.

The list of the favorites stays and grows. And these writers have grown with the passing months. Their story vision has expanded until it would be easy to float along on an even keel and rest on our oars.

But I prefer to build. It is harder, but always deep within me is the urge to excel the last issue—to go a little farther—to climb until I have a keen feeling of gazing from the mountaintop.

And then? Do you know that when I reach it I always find another, higher mountain, just beyond?

So, of course, I must buckle down and climb that one!

No sooner did I look at the May issue and feel that it was the best up to now, than I caught myself putting together a ten-story issue for June. And July is already set to lead with The Son of Old Faithful. And the August thought-variant novel brings our old friend Jack Williamson back to us with his best effort to date.

I don't want any one of you to miss a single issue this summer. They're getting better. Each mountain we climb together discloses a higher one beyond—and again we climb, because that is what gives zest to life.

There are some new names coming up—and I'm glad. We haven't skipped many of the old ones, but it's new blood that keeps competition keen. I'm going to be interested in your reaction to them, because they represent fresh viewpoints and new ideas. To me they have meant that we are moving forward.

The societies of many letters seem to be replacing the van Kampen controversy in Brass Tacks. I'm sorry we can't possibly squeeze them all in—but we can't.

Dr. "Skylark" Smith dropped in to-day and we had a mighty pleasant talk. He likes our magazine and hopes he will be able to give us another story in a year and a half or so! You know, of course, that he spends about three years' work on each one. He tells me that the mathematical calculations alone in connection with the Skylark of Valeron covered 400 pages! That means work in any language.

You know it's getting to be a very tough job trying to choose the best from among twice as many excellent stories as we can possibly use. The shortage of good material that bothered us a year ago has evidently faded into the past. And that one fact tends to paint a mighty attractive picture for the future.

Are you introducing new readers to our circle?

——The Editor.

The Law of Reaction

Dear Editor:

I am a bricklayer, and need five hodcarriers. Please send down Van Kampen and his four physicists. I want strong backs but weak minds. Van Kampen's argument is exactly the simple, self-delusory type that Fort specialized in.

Let us take Van Kampen's rocket in free space. In one second the rocket moves ten feet with a thrust of 1,000 pounds. The work accomplished is supposed to be 10,000 foot pounds. The work done in successive steps is supposed to be self-regenerating and amplifying in the proportion of 100 to 1 when a continuous thrust of 1,000 pounds is used. Holy cow! Now, instead of a continuous thrust, let us give the rocket only an initial, momentary impulse of 1,000 pounds. Since our rocket is in free space, it will obey the first law of motion. There goes the rocket ten feet and 10,000 foot pounds of work has been done in one second, another second 10,000,000 foot pounds is the result, that is, according to Van Kampen. According to his theory, the rocket will accelerate whether the 1,000 pounds force is continuous or an initial impulse. Let him deny that.

Then again, Case One. The rocket in free space moves 10 feet at 1,000 pounds thrust. He says 10,000 foot pounds of work is the result.

Case Two. The rocket moves five feet at 1,000 pounds with the result of 5,000 foot pounds of work done. The rocket moves another five feet and 25,000 foot pounds of work has been done. In both cases the rocket moved ten feet! What logic! Figure out what our Sun should be doing in speed since its creation!

Van Kampen has been applying the wrong formula to the problems, also totally disregarding the laws of motion of bodies in free space and the law of reaction.

Here is how I look at the problem. The formula W=FXX applies only when an object has inertia. An object in free space will describe a straight line with a uniform velocity, so that once the rocket is set in motion by the 1,000 pound force, the rocket no longer represents inertia to the 1,000 pound force. There can be no acceleration since there is no longer any reaction between the rocket and the force. It is simply a waste of energy to have the force continuous, since, according to Van Kampen's theory, the rocket should accelerate with only an initial impulse, but he hides the conclusion by saying the thrust is continuous. He disregards the fact that a moving body in free space is only potential energy, and we cannot measure the work done until the body comes to rest, at which time, according to the law of reaction, the energy given up will be exactly that used to move the body, that is, at 100% efficiency.

The formula W=FXX is inapplicable simply because we cannot obtain the X (distance), as it is cancelled by the law of motion of free bodies in free space.

I've only had high-school physics, so I may not have arranged my argument in a scientific manner, but I hope that one of us "keepers of the sacred cows" will get over his disgust at such propositions, and give it to Van Kampen good.—Vincent Anyzeski, 19 Pardee Street, New Haven, Connecticut.

We Apologize!

Dear Editor:

For not publishing my letter under Brass Tacks in the March issue, you and your entire staff shall be destroyed! Yes! On March 28, 1935, at 2:30 p. m. I will direct my disintegrating beam on the block where you live and disintegrate you, your staff, and the building, to nothing! Heh! heh! heh! So beware! The master mind ordered me to warn you first. He also said that only an apology can save you, and that you must print every letter under Brass Tacks in the future. What do you have to say? Heh! Heh!—Honorable Bashore, Inventor of Bashorite, the Marvel Metal, 310 N. 7th Street, Lebanon, Pennsylvania.

Another Department?

Dear Editor:

Van Kampen sure thinks a lot of himself. Says he, "Mr. Kaletsky's letter . . . seems to me . . . data beginning blastingly in truth."

Now refer to the "beginning" of Mr. Kaletsky's letter. Quote: *"The Irrelevant* is a remarkable science-fiction story, one that deserves preservation in the hall of fame of scientifiction." And Van Kampen unblushingly agrees! See March Brass Tacks.

You are getting stories even better than those belonging to the early period of scientifiction. *Proxima Centauri* is hereby acclaimed the greatest Leinster story of the year. And Nat Schachner wrote one of the best stories I have read—*Mind of the World*, of course—just after I had suggested that he needed a vacation. Your shorts, ceasing to be merely fiction, have become literature. I miss the flavor the *Skylarkers* gave the magazine, but their loss is largely compensated for by the Campbell serial.

My stf. suggestion of the year: Open a short-short department, *à la* Top-Notch, where you discover new authors and ideas. 'Sworth giving a little thought to, I hope.

B'lieve me, you're still going up hill!—W. B. (Wild Bill) Hoskins, 44 College Avenue, Buckhannon, West Virginia.

Correspondents Wanted

Dear Editor:

I just had to write in and tell you how much I admire and appreciate the work of Elliot Dold. His drawings have strength, and he has mastered the difficult art of putting bigness in his illustrations. His first illustration for part four of *The Mightiest Machine* was, in my opinion, positively beautiful. Compare that masterpiece with the work of Paul or Morey! Paul is supposed to be famous for his fine drawings of machines, but compared to Dold, his work is more like chicken scratching. Why not get Dold to do a cover, for a change. I am sure he would be appreciated.

I am still in favor of publishing Astounding twice a month. I believe you have progressed far enough to take the step. However, I am not in favor of publishing another magazine such as Mr. Wollheim suggests. I agree with Jack Darrow: "Once you've read one, you've read them all."

The letters concerning Karl van Kampen's rather disturbing scientific bombshell are as interesting as a short story. In his letter, Mr. Kaletsky terms current science-fiction as "trash." If science-fiction is "trash," as he calls it, why, then, does he continue to read it? Enough concerning Mr. Kaletsky.

In a recent issue, you stated that you were trying to secure a story by the one other artist in the science-fiction field. My guess is that the one referred to is none other than Dr. David H. Keller. If I am wrong, then you have yet to publish a story by no less than two of the best authors. By the way, Eando Binder and Lawrence Manning aren't bad at all. You wouldn't lose much by publishing something from their pens.

Thanks for answering my letter, but this time, please try to see that this finds its way into Brass Tacks, for I am woefully in need of a correspondent about my age—13. It sure is terrible to be interested in such fascinating literature as stf., and having no one with whom to exchange ideas and opinions.—Corwin Stickney, Jr., 28 Dawson Street, Belleville, New Jersey.

Defending "Lo!"

Dear Editor:

In the last two or three issues of Astounding Stories there have appeared numerous communications in regard to Mr. Fort's *Lo!* The great majority of these repetitious letters term *Lo!* as being the worst piece of literature to appear in A. S.

In the March, 1935, issue of A. S., for instance, Mr. Oliver C. Davis terms *Lo!* as being "utter drivel"; Mr. J. J. Johnson calls it "foolish and incoherent"; Mr. Armand E. Larsen was "bored" with it; Gerald H. Adams says he got "dizzy" from reading some of its paragraphs . . . and on it goes.

Some months ago I wrote to A. S. I tried to make a certain reader who denounced *Lo!* see things in a different light. Instead, more letters have come in denouncing *Lo!* Strangely enough, however, very few of these "critics" gave reasons as to why they thought *Lo!* to be utter drivel, foolish, incoherent and boring.

I still insist that *Lo!* is a very interestingly written scientific article. It made one think—and when an article makes one think it must be a darned good article! It must be admitted that Mr. Fort had brains—yet some readers had the stupendous audacity to say that Mr. Fort was insane!

In all probability the late Mr. Fort was a hobbyist specializing in collecting newspaper articles pertaining to unusual occurrences with a possible scientific explanation. After a number of years Mr. Fort decided to write a book, telling of the results of his interesting hobby. This book was published in serial form in A. S., and I have found it of a very interesting nature. Personally, I thought *Lo!* to be one of the best scientific articles I have ever read. I have found it far more absorbing than any story A. S. has published up to date. And, to be perfectly frank, all of your readers who have so unjustly criticized *Lo!* must be mere children or persons who do not know enough of science and journalism to understand what *Lo!* was all about. When a person reads such an article and becomes bored, that person should never indulge in science. *Lo!* was intended for people who think—not for kids who want A. S.'s pages to be full of heroes who do the most spectacular stunts imaginable. *Lo!* was a grand piece of work! Why doesn't somebody admit it? How can any one read such an interesting scientific article and not praise it? Really, Mr. Editor, some of your readers are surprisingly lacking in brains—they don't think!—Theodore Lutwiniak (Ted Lutwin), SPWSSTFM member, 172 Pavonia Avenue, Jersey City, New Jersey.

On Ancestry

Dear Editor:

Although I am a native of Rome, Oneida County, New York State—I am of a blue-blood family there, of the most blue-blooded ancestry, Darwin, Hall, the Paveys, Kellogs, etc.—New York City has always seemed sort of "foreign," and I can remember when a lot of it was very rural.

The first time I read Astounding Stories, there was a bit of the so-called occult, supernaturalism, in it, and it gave me unpleasant feelings, for I believe in my ancestor Charles Darwin's theories. However, it keeps getting better all the time. I have a hunch that it may stimulate the imaginations of scientific and inventive-minded men, as Jules Verne's and others' works have done, and, quite likely open a new vista for expansion of mankind and his activities.

Interplanetary transportation must be an accomplished fact, sooner or later, if for no other objective than to permit sober-minded people, who find certain mental attitudes among the human branch of the great apes intolerable, to gather some of their own kind around them and—escape to another planet. Let the selfish, greedy, and snobbish, with their moronic sychophants, have the whole Earth and the fullness thereof all for and to themselves. Let them persecute, scold and murder each other concerning hair-splitting differences between their various brands of worship—and the rest of us be protected by a vast wall of—space.—Darwin Kellogg Pavey, 1916 Chippewa Street, New Orleans, Louisiana.

"Colossus" *Again*

Dear Editor:

First let me cast my vote on the question of A. S. going semimonthly. It is decidedly negative. Please do not flood the stf. market and cause some of the fans to miss even a single issue of any science-fiction magazine.

I should much rather see you put out a quarterly; in fact I should be very pleased if you issued a quarterly. It is so pleasant to get to read a complete book-length novel in one issue, without the torture of waiting for installments. Please issue a quarterly of 140 pages, and priced fifty cents. It ought to take care of your surplus good stories.

Some of the best stories printed in the new Astounding Stories were: *The Coffin Ship*, by Anthony Gilmore; *Redmask of the Outlands*, by Nat Schachner; *Beyond the Sphinx's Cave, Sidewise in Time, The Mole Pirate*, and *Proxima Centauri*, by Murray Leinster; *Spoor of the Bat*, by A. L. Zagat; *The Bright Illusion*, by C. L. Moore; *Energy*, by Harl Vincent; *Old Faithful*, by Raymond Z. Gallun; *Statosphere Towers*, by Nat Schachner; *Legion of Space*, by Jack Williamson; and especially the two latest serials, *Skylark of Valeron*, by Edward Elmer Smith, and *The Mightiest Machine*, by J. W. Campbell, Jr. There are a lot more good ones, but not the space to list them!

One of the worst stories you have printed is *Colossus*. It might be merely prejudice on my part, but ever since I read his first story in Astounding, *Raiders of the Universes*—in the old A. S.—I've been off him. Anybody who writes a story about an Earthman gallivanting around on a planet that's supposed to be made of metal, and larger than Neptune—without noticing any change in gravitation, defeating, single-handed, great metal monsters, doesn't go with me. Moreover, in *Colossus* he seems to have slightly "altered" a well-known theory without giving any indication that he was doing so!

Another thorn in the flesh is C. C. Campbell. His *Inflexure* was merely a hazy mixture of four-dimensional suns and half-baked science. The plot of that may have been new, but even the plot of *Gold* wasn't. Throw him out!

I may be dense, but I can't see any violation of the law of conservation of energy in *The Irrelevant* by Karl van Kampen. Maybe that's because I didn't have the patience to finish it, though.

John Russel Fearn was good in *The Man Who Stopped the Dust* but punk in everything else.

The only story in Astounding Stories that I didn't even attempt to read was *Colossus Eternal*.

Let me end this missive by making a plea for a bit less of the hazy-conceptional type of story and more adventure stories like the old A. S. used to publish. I'll never forget *Hawk Carse, Brigands of the Moon*, and the others! Also give us more thought-variants of the type of *The Man from Procyon* and *The Mole Pirate*.

I also prefer Wesso to Brown, for covers. Wesso's machinery *looked* like machinery, even though his space ships weren't so hot. Dold is good, but could be better in drawing faces.

Kindly chuck this epistle into the rightful place for such—the wastebasket!—Oliver Saari, 1342 1st Street S. E., Rochester, Minnesota.

Accuracy And Science-fiction

Dear Editor:

Proxima Centauri proved conclusively to me that science-fiction has "come back." It definitely has—for good, we hope. That horrific slump during 1932-33 has evidently brought out the fine qualities that can be put into this different and difficult literature. I have in collection, and have read, everything in magazine science-fiction since 1926, and a large amount as far back as 1906. But I can convincingly say that never at any time have I seen the literary quality, the scientific accurateness, the skillfulness in writing, and artistic illustrative quality, that we find to-day. In my honest opinion, which opinion I have adopted only within the last two months, Astounding Stories leads the field in scientific accurateness. Although a wee bit of that "blood 'n' thunder" still seeps into your stories, your science is accurate.

Dold's work, although less "artistic"—in the true sense of the word—than Leo Morey's, suits science-fiction better. I say this unbiased, because I am, or rather hope to be, an illustrator myself, and I can, I believe, judge honestly and intelligently on this matter.

I used to be a rabid Wesso fan, but Dold has so far surpassed the former, that I have lost all interest in him. So we can conclude that Elliot Dold is the peer in the science-fiction field. Not necessarily because he is more of an artist, but because his wonderful lines and curves, and his potent imagination fits science-fiction to a "T."

Howard V. Brown—I used to marvel at his broad imagination on his "Electrical Experimenter" covers—is an artist. He definitely knows his colors and figures. But he does not know the proper arrangement and balance that science-fiction covers need so badly. His imagination is excellent. His figures are human. His metal on space ships, etc., is wonderful. But he consistently puts too much on his covers. The only cover I really liked of his on Astounding was, I believe, on the September, 1934, issue, or maybe it was August. Anyway, it portrayed a lone space ship, the *Skylark*, I believe, on a light background. The center and only figure in the picture was that elongated ship, headed to the right of the reader. Here was simplicity. And simplicity is essential on a science-fiction magazine cover.

Milton Kaletsky—old fan that he is—claims to have left science-fiction. That is too bad. He does not approve of your science policy. That also is too bad. Apparently Milton Kaletsky wants his science-fiction to be similar to Trautwine. He says your science is all wet—false—blasphemous—in other words it is not technically accurate down to the eighth decimal.

All right, Mr. Kaletsky. You want Trautwine—we want science-fiction. Some one once told you that if you were allowed to edit one issue, that one issue would become a Trautwine. Now, Mr. Kaletsky, no one ever claimed that science-fiction, and the science contained therein, was absolutely accurate. No one wants it to be. In fact it would be impossible to have it thus. Even Trautwine is not absolutely accurate. The basic principle axis on which science-fiction revolves is the play of imagination. There is nothing imaginative about reading an engineer's handbook. We must depart from our present status of civilization to give the imagination its play. Perhaps no one does this better than John W. Campbell, Jr., and his fantastic science is certainly not accurate—not even near accuracy. Yet he is a favorite, if not *the* favorite, author. You see, Mr. Kaletsky, you are the one who is all wet. We don't want accuracy in science to the degree that you seem to have it. So we cannot do business. We have directly opposite views. Science-fiction can do without you—you without it. But between you and me—*you* are the loser.

You, dear editor, have done much to boost this science-fiction affair. Believing in it as I do, I can appreciate what you have done. You wish to improve your magazine whenever possible. That is more than many can say. All we can do is help you, and hope that some day this literature can hold its rightful place in the world. But take it easy—jump only after much thought. And you'll get there.—Lewis F. Torrance, 1118 Fifth Avenue, Winfield, Kansas.

We have on hand letters from people who have back copies of Astounding Stories for sale and we will be glad to send names and addresses to any one desiring copies. We find that we do not have room in Brass Tacks to run advertisements of this sort individually.

Warning To Tucker!

Dear Editor:

I have just received the April issue of Astounding Stories and think it O. K. Howard Brown's cover illustration was certainly a masterpiece although a bit vague. He should receive praise for it.

All the stories were good. *The Lotus Eaters* however, was outstanding. To my way of thinking it was the best yet from Weinbaum. *The End of May* was great. I re-read it twice and came to the conclusion that Paul Ernst has what it takes. The others were all very fine although *Triple-Geared* bore a remarkable resemblance to one of H. G. Wells's yarns.

I am very happy to hear that a sequel to *Old Faithful* is coming up and that also some time travel stories are on the schedule.

The Sterling-Wollheim combination ought to prove quite a rival for Bob "Dictator" Tucker.—L. P. Wakefield, 2832 Marshall Way, Sacramento Calif.

"The Irrelevant," *a Stimulant!*

Dear Editor:

I have watched with interest the argument raging in your columns concerning *The Irrelevant*. The arguments advanced all seem to depend on the fact that there is no such thing as absolute velocity.

But there is. Absolute velocity is nothing more or less than the ratio of distance traveled to the time required to travel it, according to the equation: $v=s/t$.

This equation is absolutely independent of any point of reference and, therefore, expresses absolute velocity.

Applying this definition of velocity to the problem of *The Irrelevant* should make the fallacy of the author's reasoning clear.

My thanks to the author for giving us a story which made us do some independent thinking. My thanks to the editor for publishing it. My thanks to the readers for answering the challenge.—Charles S. Wylie, Jr., 529 N. Bois d'Arc Tyler, Texas.

Suggestions!

Dear Editor:

I was very much pleased to see that you have a serial by John Taine scheduled to start in the May issue. He is truly a great master of science-fiction. However don't think that you have gotten all the really great masters of science-fiction; the two greatest are still outside of your fold. One, A. Merritt, I will admit is not available at present, but the other, Dr. Keller, should be gotten as soon as possible. Imagine an issue of Astounding in the near future: "Stories by Keller, Taine, Weinbaum, Cobientz, Leinster, Vincent, Fearn, John W. Campbell, Jr., and, of course, Dr. Smith. There's a list that can't be beaten! Too bad Astounding isn't the size of a dictionary so they could all be in one issue.

I notice that Marchioni is doing about half the illustrating in the current issue, thus relieving Dold. If Dold has a little time to spare why not give him a chance to do a cover? If you go twice a month—which, by the way, I oppose, favoring a quarterly instead—Dold would never have the time, so it's now or not at all. I am sure that every reader would like to see at least one cover by him in our magazine.

Most of the stories in the April issue were excellent. The mightiest Campbell brought *The Mightiest Machine* to an excellent conclusion and *The Einstein Express* got off to a fine start, though I don't believe it is destined to become a classic. *The Lotus Eaters* was the best complete tale with Vincent's story close behind. The other short stories were fair. It would be a superexcellent issue—if it wasn't for *Age*. The story was not especially interesting and the science(?) was definitely misleading. "Isotope of water," "water with a higher valence"—those phrases don't make sense to me, and so far as I know D_2O is the formula for heavy water, not H_4O_2. I don't pretend to know much about chemistry, but it seems to me that Dr. Campbell shows lamentable iguorance about the real nature of heavy water and the meaning and use of the words "isotope" and "valence."

I have long had a theory that the different types of heavy and light water could be made by combining hydrogen and its isotopes with the different isotopes of oxygen, but it is plain to see that it is not what Mr. Campbell meant, so all we have is that heavy water might cause senility, and the only food for thought is: how did that get by the editor?—Paul Freehafer, Box 12, Payette, Idaho.

Van Kampen Primitive!

Dear Editor:

The following commentary represents the opinions of both myself and several of my friends concerning the Van Kampen controversy, although we do not submit it for consideration of that dauntless iconoclast. Our appeal is to the editors. As habitual readers of Astounding Stories we resent the occurrence in it of anything of detrimental quality.

This little problem can be sent scampering from a number of angles, but the simplest is this:

Inertia is the property of matter causing it to remain at rest or in motion unless acted upon by some external force. Therefore, no energy is required for a rocket ship free of external forces—gravity—to maintain a constant velocity. It is doing no work; it is consuming no fuel. The consumption of fuel, in fact, could only act to accelerate it, retard it or alter its direction. If the operator of the vehicle started for the moon without realizing that gravitational forces would vary greatly during the course of the trip, he must be described, however reluctantly, as non compos mentis.

Lest it be mentioned on behalf of the opposition, we will survey the yard or two of tripe with which Mr. van Kampen apparently feels that he has countered every attack.

He opens with the most primitive dialect, mentioning that presumably competent persons have gnashed their bicuspids over the question. We should be obliged to Mr. van Kampen if he would reveal at which colleges the professors teach, that we may spare our children from attending them. If nothing is offered in self-defense, we are determined to boycott the M. I. T. as well.

Our genial author then proceeds to remark that work is the overcoming of inertia, a statement which will render a great many textbooks obsolete and chagrin innumerable physicists.

It seems that Mr. van Kampen trusts the orthodox texts for the remainder of his letter, a collection of miscellaneous elementary data regarding the efficiency of the internal combustion motor, the unit progression under acceleration, and the mass weight variable—all choice bits of copybook pedantry, and all totally extraneous to the proposition.

We do not object to Mr. van Kampen's revising physics for his private amusement, but for publication purposes we consider unconscionable everything about *The Irrelevant* except its name to which we feel should be added "incompetent" and "immaterial."—J. P. McCormack, 106 Bellevue North, Seattle, Washington.

A Few Knocks and a Couple of Hints!

Dear Editor:

I have just finished reading your April issue. I was surprised at the improvement shown over even the previous issue. The best story, in my opinion, is *Age*, then came *The Mightiest Ma-*

chine, The Lotus Eaters, and *The Einstein Express,* in the order named. Your short stories for this issue were good as short stories go, but they still are not up to standard in comparison with the longer stories. The best one was *The 32nd of May,* and the poorest one was *Life Current.*

I suggest that you add a novelette or a novel in place of two or three short stories. I like Stanley G. Weinbaum's stories very much, and he is one of the main reasons for your rapid improvement. You sure are able to put good serials into our magazine. I was sorry to see, though, in my opinion, the too-abrupt ending of *The Mightiest Machine.* It had been improving steadily and with that smashing climax, now deserves a place in the Hall of Fame of Science-Fiction.

Now for a few knocks and suggestions. The only things wrong with your last issue were *Life Current,* the cover—which I believe is a deterioration from the previous one—and the illustration for *Age.* A story as good as that ought to rate a better illustration than that. I thought Dold was your best artist, but that drawing is a disgrace to the reputation he has built up for himself. Another thing: why don't you straighten the edges? It makes the magazine look better, and also makes it file better and not get ruined whenever you take out an old one to re-read some of your favorite stories. And why can't you quit cluttering up Brass Tacks with abstract formulas pertaining to *The Irrelevant.* It was a good story so why can't you "mathematicians" let it go at that? Lastly, since you have had good luck in getting advertisements, you have used space that should contain stories for them. Have a special advertising section, but please do not gyp us out of our one hundred and sixty pages of good reading material.—Homer Aschmann, 3526 E. 5th Street, Los Angeles, California.

The King's English!

Dear Editor:

I have read Astounding Stories from its beginning and have carefully preserved every number. Always I am amused at letters written to Brass Tacks by readers who labor under the delusion that they are literary critics.

It is ever the same. "That story was rotten." "That one was a wow." "Hurray for this one." "Phooey on that one." And what does it all amount to? Only this: an expression of personal like or dislike for certain types of stories.

A criticism of incorrect scientific statements is proper, and from one who is qualified to do so, should always be made, but to list stories as swell, fair or rotten doesn't mean a thing. Also to call the magazine a "mag" reminds one of magpies and maggots.

Could any of you who make these complaints write a story that would be accepted and published? Then how little right you have to criticize the work of another, unless you can do the same work yourself and do it better. Yours for more logical critics.—H. A. Mooers, M. D., Cowart, Virginia.

A Word to the Best!

Dear Editor:

Astounding is all right. That's my viewpoint, editor. Resisting to write to you in commenting on your last three issues would be a crime. I haven't quite finished the April number yet, but I can't wait any longer.

Starting with the February issue, here comes the blabber:

Discus Men of Etka by Buchanan and Dr. Carr, and *The Ultimate Metal* by my old standby, Nat Schachner, are the best stories. *Parasite Planet* by Stanley G. Weinbaum comes next.

As for March, that issue was a wonder. Nat Schachner did his best in *Mind of the World,* the best story in the magazine. Of course, *Proxima Centauri,* by Murray Leinster comes second. The two best short stories are *When the Sun Dies,* by Chan Corbett, and *Blindness,* by Don A. Stuart.

But the best is yet to come. In the April number, the first installment of *The Einstein Express,* by J. George Frederick, stands out in front of any science-fiction story I have ever read. *Age,* by Clyde C. Campbell, is also very interesting. *The Blue Earthman,* by Long, and *The 32nd of May,* by Ernst, are the best short stories. I haven't come to *The Lotus Eaters* yet.

In all, these three issues, *The Mightiest Machine,* by John W. Campbell, Jr., was continued and ended with a bang.

And for the next month, here's hoping *Twelve Eighty-seven,* by Taine, and *Alas, All Thinking,* by Bates, are stand-out stories. I'm sure they will be. Also, I'm sure the ending of *The Einstein Express,* will be altogether supercolossal-wonderful-miraculous, or, in other words, swell plus very exciting and interesting. Hip hooray for Frederick! Give him a hand, folks.

So much for Frederick and his *Express.*

I'm another of your readers who has aching eyes that want to see a new Astounding on the stands twice every month.

As for your illustrations, Dold is doing fair on the stories, but Brown is doing excellent work on the covers. His paintings on the February and April issues were very attractive.

To close, I'll just say that Astounding is, has been, and always will be my favorite of science-fiction.

Please publish this for I am looking for some one who will sell their number with *Farewell to Earth* in it.—John Chapman, 309 1st St., S. E., Minot, North Dakota.

It's a Democracy!

Dear Editor:

Will you please stop this copying by Wollheim and Sterling of SPWSSTFM? It is nothing but an attempt by a minority to stop the will of the people.

The Mightiest Machine is A+. What an ending. Weinbaum as good as usual. *Age* is fair. *Life Current* wasn't so hot.

More Weinbaum and Leinster.—Tom Jackson, Kansas City, Missouri.

Microscopes and Field Glasses!

Dear Editor:

O yez! O yez! O yez!

Know ye by all these presents that I, R. M. Holland, Jr., Grand Bozzywoz of the Independent Order for the Prevention of the Use of Hair Tonic in Painting the covers of Stf. Publications in the Great Nation of Pumperdink, Patent Applied For, do hereby combine forces with "Dictator" Tucker, of the SPWSSTFM to combat the evil intentions of the iaopumumpstfpusa (they don't rate capitals)! Foremost among us is the great Horatio Q. Snigglefritz S. O. S.; P. D. A.; B. V. D.; N. U. T. T. Y., inventor of the terrible light ray (flashlight).

Come on iaopumumpstfpusa!

For the cause!—R. M. Holland, Jr., Grand Bozzywoz SPWSSEFMAWIOFPOTUOHT IPTCOSTFPITQNOPPAF, 702 Griffith Ave., Owensboro, Kentucky.

No Romance in Fantasy?

Dear Editor:

I can't resist the temptation to write about what I think of the new Astounding Stories.

I am almost word for word in sympathy with Ed Camille, of Erie, Pennsylvania:

During the time of the old Astounding Stories I regarded it as the best reading of any kind there was and I hardly skipped a single issue. Lately what issues I have bought of it have have been few and far between and always I have been disappointed.

Like Camille I dreamed of my old favorites: Hawk Carse; Burke's, *Earth, the Marauder;* Sewell Wright's stories of John Hanson: Cummings's *Beyond the Vanishing Point;* Diffin's *The Moon Master* and *The Pirate Planet,* and Sewell Peaslee Wright's stories of Old Commander Hanson and his interplanetary patrol. been few and far between and always I have been disappointed.

Since it is hardly fair to criticise a magazine without giving reasons for such I will tell you why.

Those old stories were filled with romance and adventure, of freedom and classics. They made you think, filled you with the awfulness, the bigness and grandeur of nature.

The new type of stories are mechanical, machinelike, filled with big words and wild impossible scientific theories as though ground out in some great machine. They belittle the universe, the forces of nature, time and space.

I disagree with him only in his argument that the old stories were impossible and fantastic as compared to the new. Nothing could be more fantastic than these animated chemistry lessons.

I read magazines for enjoyment and not for scientific theories and ideas. I'm sure that a good many other fans do the same. I agree with Ed on putting out two types of magazines. I'd be the first purchaser.

I did like *Parisite Planet,* by Stanley Weinbaum. It was the only story in your last issue that was satisfactory.—G. Harradon, Goffstown, New Hampshire.

Top-Notchers and Beyond!

Dear Editor:

No doubt about it, yours is the best magazine in the field. I believe we could get along quite well with Astounding running bimonthly and eliminate the other two comparatively weak contestants.

I'd like to know if you have scheduled anything of the following authors: L. Taylor Hanson, Charles Willard Diffin, Ed Earl Repp, Clark Ashton Smith, and Edwin K. Sloat.

As for the April issue, it was superb. I don't know where you ever got Mr. Frederick, but hold onto him by all means. *The Einstein Express* is something revolutionary in science-fiction.

As for our great serial, *The Mightiest Machine,* now that it is completed we can comment upon it more fully. Campbell is undoubtedly a great author, one of the best, but in this story he went far out of his province. Granted, the story was a marvelous piece of fiction, exciting and well written, but Campbell went just a little too far into the realm of improbability. As for the others—*Age* was fairly good. *The Lotus Eaters* was great. Weinbaum is a rare find, only I wish he would confine himself more to science than to adventure fiction with a science-fiction background. Long has written some fairly good stories, but the *Blue Earthman* was junk. *Triple-Geared,* by Coblentz, was great. He has the humor of O. Henry and reminds me of him greatly. You can never guess how one of O. Henry's yarns will end and Coblentz follows this perfectly. His *Triple-Geared* was a good example of this type of story.

As for Harl Vincent, I was disgusted. He seems to be slipping. The story, *Prowler of the Wastelands,* had no point to it. The cat comes, loves the girl, goes—so what? As for Wandrei—I can't see how he could write such a masterpiece as *Colossus* and turn out something like *Life Current.*

It's not the stories I'm disgusted with, they've got the others beat a mile. It's the authors that are getting all of these brickbats. Every one of them is a top-notcher and each could do far better. Compared to stories in other magazines, these are works of art, but there's no reason why Astounding shouldn't be so far ahead so as not to be even considered in comparison with the others.—Irving Kosow, 3415 Fulton St., Brooklyn, New York.

Appreciation!

Dear Editor:

Illustrations: The worst thing in the new April issue was the drawings by M. Marchioni. I suppose the poor man has to eat, but why must you buy his attempts? Witness the picture for *The Blue Earthman.* Ugh! I hope I'm not too grouchy. My favorite illustrators are Howard V. Brown for covers, Elliott Dold and Paul. Why, Mr. Editor, don't you get Paul? Paul, do you hear? However, it's the stories that count.

Stories: *The Einstein Express* has me all stirred up. I'll get the next issue if I have to steal. *The Blue Earthman* was good, up to the Frank Belknap Long standard. I liked best of all his stories, *The Vapor Death* and the *Last Men. The Lotus-Eaters* was—ahem—swell. *Age* was well-written and interesting. *Triple-Geared, Life Current, Prowler of the Wastelands,* were all quite up to the Astounding standards. *The 32nd of May* was very "hexagonal." I am waiting for that March issue before reading *The Mightiest Machine.*

Well, I could go on talking about my Astounding Stories all night, but won't. And, pullease, you pugnacious and belligerent writers, don't hop on me for my comments.—Alan H. Newcomb, 7 Oak Hill, Delaware, Ohio.

On "Going Nuts!"

Dear Editor:

Just finished the last part of *The Mightiest Machine.* It was one of Campbell's best. Keep him writing! I've been a reader of science-fiction since 1926 and I am also a collector of science-fiction magazines.

Since you have taken over the mag it has improved beyond hopes. In my opinion and the opinion of many other readers of science-fiction in Boston, you are way in the lead. Keep it up.

Tucker's nuts; I hope he stays nuts and writes some more letters. I also see that Wollheim is going nuts and going fast.

And now Keating in his last letter. In his first paragraph he says that stories about space ships are stupid. Then why are so many men trying to develop a way to travel in space. I would also like a list of the real scientists who agree with him. When anything new in the way of science is thought of who are the last to accept it? The scientists. The majority of scientists are specialists. They know in a general way about other subjects. When something new is discovered in their own field they are last to discover it because a scientist is trained to make sure, to be accurate. But with some of them it takes a long time for anything new to be accepted. Take the average man. He lives and does his work and does very little actual thinking. How many men are really broad-minded? Darn few. Remember a little sentence that the few great scientists know is true: "Nothing is impossible."

At present I am missing a few issues of Astounding. I would like to get them if possible: Vol. 3, No. 2, vols. 5, 6, 7; vol. 10, No. 2. I will reply to all letters on any subject.—Philip W. Faden, 303 Fairmount Avenue, Hyde Park, Massachusetts. Director Boston Science Fiction League. First Class Member No. 486

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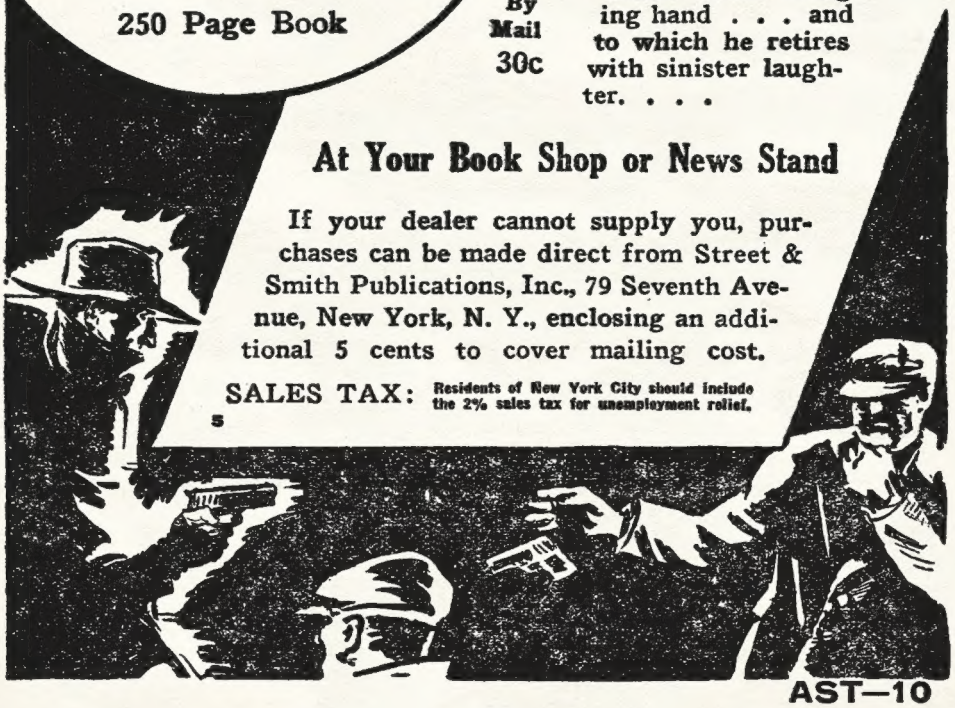

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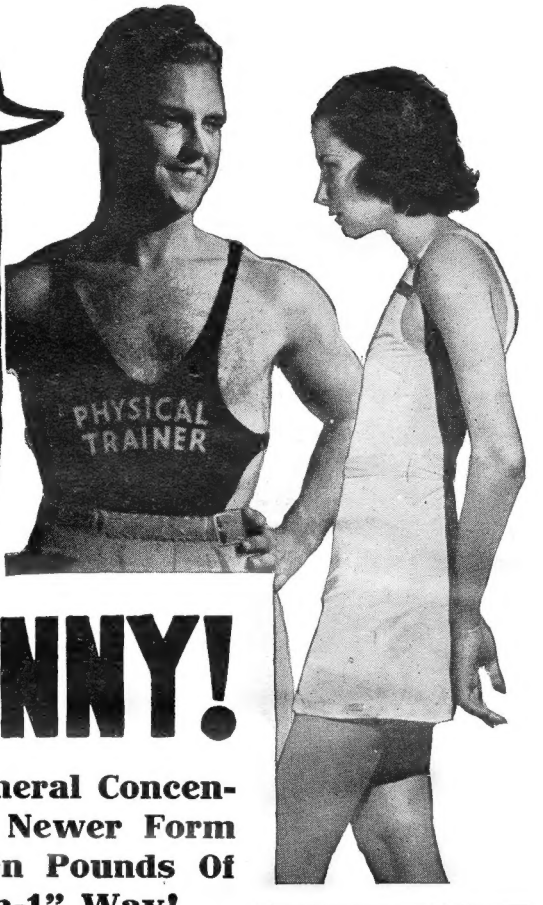

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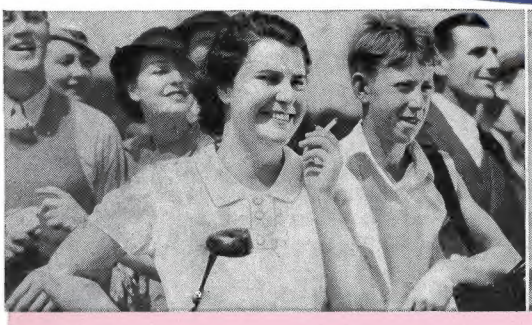

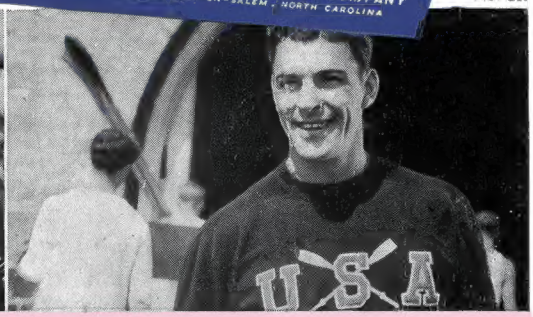

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